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Is the Artificial Calcification and Recalcification of Dental Enamel Possible?

Report of Research Into This Problem

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A perusal of authentic dental literature shows that while much thought has been given to the subject of the artificial calcification and recalcification of dental enamel, and some experimental work has been done, only a little has taken concrete form and found its way into publication. Most investigators have treated the matter in a more or less speculative fashion without expressing any definite conviction, seemingly hesitant to accept the responsibility for any controversy which the treatment of such a subject is almost sure to start.

The first authentic record of recalcification experiments leading to positive results is reported by Joseph Head of Philadelphia in his *Modern Dentistry,* 1917. The experiments were carried out *in vitro* with extracted teeth the enamel of which had been partially decalcified by acids and then subsequently treated with saliva, which effected recalcification. The result of these experiments was evidently perplexing to Dr. Head, because he took up another series of experiments to check up on the results of those preceding. This latter work, in which he used a special apparatus for testing the hardness of enamel, substantiated his previous conclusions, regarding which he says: "Surfaces tested immediately after grinding have been known to harden from fifteen to thirty per cent when immersed in saliva and exposed to the air for a period of a few hours a day." These tests have been repeated and have given results so consistent that the author feels that they are conclusive.

In summing up, Dr. Head states: "These tests seem to show that partially softened enamel may have the power of becoming hard again. . . . The hardening may be a sort of recrystallization within the enamel substance; it may reunite with something taken from the saliva." This statement would indicate that Dr. Head took cognizance of the fact that enamel is a permeable substance acting as a dialyzing membrane into which would pass calcific matter from the saliva, thereby recalcifying the etched or ground surfaces.

Bunting and Rickert report similar experiments, taking unerupted teeth and treating them with saliva of students found to be caries-free. Subsequent staining of both controls and treated specimens showed that those treated with saliva did not stain (silver nitrate) as deeply as the controls. Analyses of the saliva used in this work showed a high calcium content, which led the investigators to try calcifying experiments with solutions of commercial calcium salts. Various solutions were tried with different salts, both in water and in saliva, with the following results: "This series was carried in the tippler for about one month, the saliva-calcium mixture being changed frequently. Upon staining and sectioning the teeth it was found that the halves which had been kept in the saliva and calcium salts were considerably less penetrated by the silver nitrate than were their controls. The experiment was not carried long enough to completely fill the external enamel spaces, but such a result might reasonably have been expected had the process been continued."*

It remains, however, for H. P. Pickerill in his exhaustive reference work *The Prevention of Dental Caries and Oral Sepsis* to shed an even illumination on this rather obscure subject. He says: "The degree of permeability of the enamel surface also bears an inverse ratio to the length of time a tooth has been erupted, but the density of healthy enamel bears a direct ratio to the time which has elapsed since its formation," and sets forth in the following table the results of tests in three groups with teeth of European and Maori subjects.

This is illustrated by the following cases:

1. Three teeth, an unerupted lower third molar, an erupted upper third molar, and a lower premolar, all perfectly sound and from the same patient (aged 22 years) were examined by this method (silver nitrate) with the following results:

Teeth	*Amount of Penetration*
Unerupted third molar	0.83 mm. (or 50 divisions)
Erupted third molar, about two years' use.....	0.42 mm. (or 25 divisions)
Premolar half-sclerotic type, eleven years' use.....	0.18 mm. (or 11 divisions)

2. The following teeth were taken from different individuals:

Teeth	*Amount of Penetration*
Unerupted third molar	0.50 mm. (30 divisions)
Erupted third molar.....	0.30 mm. (20 divisions)
Molar from young adult	0.25 mm. (15 divisions)

* *Journal of the National Dental Association*, August, 1915.

Molar from old person..... 0.16 mm. (10 divisions)
The density of the stain in the last tooth was very much less than that in the third molars.

3. The following teeth were taken from the skull of a Maori child, aged about 16 years:

Teeth	*Amount of Penetration*
Unerupted third molar, (incomplete)	0.75 mm. (45 divisions)
Erupted third molar (complete)	0.20 mm. (13 divisions)
Second permanent molar, about three years' use.....	0.19 mm. (11.8 divisions)
First permanent molar, nine years' use	0.08 mm. (5 divisions)

"A point of importance to be noticed in the above groups is the comparative equality of penetration in the unerupted molars of both Maori and European. This would seem to point to the fact that the cause of the subsequent difference in the permeability of the various enamels is not entirely a developmental one, but rather is a property acquired largely after eruption.

"Comparing the second permanent molar of the Maori with the premolar of the first group, it is seen that in two years the Maori tooth has become as impermeable as the European tooth has in eleven years."

In making an investigation of the surface of the enamel, over 1000 teeth were examined microscopically and physically and for the purpose were divided into three empirical or clinical groups:

"1. Native teeth, comprising those of uncivilized races afflicted but little, if at all, with caries.

"2. Sclerotic teeth, comprising that clinically well-known class of teeth which are characterized by their hardness, usually yellow color, and immunity to caries.

"3. Malactic teeth, a well-known clinical variety, characterized by their comparative softness, whiteness and susceptibility to caries."

After making this classification as a matter of convenience, Dr. Pickerill made extensive and involved tests of the penetrability, density and hardness of the enamel of the three classes and at the conclusion thereof has the following to say in defense of this classification: "At present the indications seem to be fairly constant and support our contention that there is a difference between 'hard' and 'soft' teeth, that this difference is capable of being measured, and that the terms *sclerotic* and *malactic* in their literal meaning are justified."

Convinced of the soundness of these classifications, that the enamel

of some teeth was harder than others and was less penetrable to stain (silver nitrate), and that this difference was due to posteruptive calcification, Dr. Pickerill then undertook the task of duplicating Head's experiments in rehardening decalcified enamel. The report of this work is found on page 122, in which Pickerill has the following to say: "I have repeated Head's experiments and carried out others on similar lines. Teeth—native, sclerotic and malactic—have been immersed in various strengths of lactic acid and in orange juice and exposed to the fermentation of carbohydrates with saliva, until well-marked opacities of the enamel were formed and the surface could be cut with a sharp scalpel. They were then transferred to saliva and kept in it (with occasional changes of saliva) for a period of three months. The reaction of the saliva was always alkaline. At the end of this period the teeth were removed and washed in running water, dried carefully with filter paper (friction being avoided) and exposed to the air for four hours. On examination, in one tooth—a malactic canine—the enamel, which was previously soft and friable, was certainly considerably harder and the opacity had almost disappeared. In another tooth—a Maori canine—a very small and rather doubtful opacity had also disappeared. In all the remainder (seventeen) the opaqueness of the enamel was still present and had not apparently decreased, although it seemed that in some cases the enamel had become slightly harder and required more pressure to cut it with the scalpel than it did originally. The results of these experiments, then, neither confirm nor negative Dr. Head's hypothesis. They will require repeating several times before a definite conclusion can be formed. I think it is not unlikely that it will be found that under certain conditions rehardening both can and does occur."

From the foregoing it will be seen that the writer's object in noting these quotations is to show that some of the leading investigators have seriously entertained the idea that if posteruptive calcification were a physiological function, it might be determined by laboratory experimentation by just what means or processes this phenomenon was brought about, and, having once determined that, they would by careful scientific investigation be able to tell with a fair measure of accuracy why in many cases the failure of this function is not only partial but complete and then institute the proper correctional treatment in each individual case.

That the results obtained by these investigators were not far-reaching nor startling is shown in each report. Dr. Head is quite positive that "partially softened enamel may have the power of becoming hard again," if treated with saliva, but does not include in the report whether the saliva was acid or alkaline, or what elements in the saliva in his opinion would "reunite" with the partially softened enamel to reharden

it. The report of Drs. Bunting and Rickert is interesting in that they tried to recalcify enamel artificially by using solutions of calcium salts. Why this experiment, which gave promise of some interesting disclosures, was not continued is not stated in the report, although one is led to the belief that with a little more work along this line success would have crowned the effort. The report of Dr. Pickerill's work shows careful planning and extensive research and, while it is really a check-up on Dr. Head's hypothesis, it apparently led Dr. Pickerill into experiments which substantiate the theory enunciated by C. F. Bodecker of "secondary calcification" and to the establishment of a much needed classification of teeth indicative of their hardness or softness, namely, sclerotic and malactic, respectively.

It was enunciated by Bodecker, substantiated by Pickerill, and observed and recorded by many others that the enamel of teeth at the time of eruption is not completely calcified, and that calcification continues and proceeds as a normal physiological function after eruption. This subject has been and still is the source of much controversy and has called forth both defense and denunciation from the master minds of our profession.

Any discussion dealing with either the physiology or pathology of dental enamel would not be complete without a quotation from J. Leon Williams, whose name is inseparably connected with the subject. In his early writing on histological studies of enamel, Williams held that this substance was a fixed, impenetrable structure, and that no regenerative changes could take place. This opinion was also held by Green V. Black, who stated that he had tried to stain the structure of enamel and found it quite impossible. More recently, as the argument waxed hot, Dr. Williams was prompted again to take up the tedious, heart-breaking task of grinding and staining minute pieces of enamel in order that this subject might be, if possible, settled once for all.

This most recent monumental work of Dr. Williams requires one entire issue of *The Journal of Dental Research* (Vol. V, No. 3) for its exposition. In this paper (p. 118) Dr. Williams says: "As I look back now upon my belief that enamel was an unstainable tissue, I am astonished and somewhat puzzled to know how I missed making the experiments which would have demonstrated my mistake. But my wounded vanity is somewhat soothed by the knowledge that in holding this belief I had the support of so acute and able an observer as my old friend, Dr. G. V. Black. Let me say then, at the outset, that I have not found any human tooth which is not permeable to stain in some part of its enamel structure."

In the matter of histology and pathology of dental enamel, without detracting one iota from the work of others along this line, it might well be said that Williams is the court of last resort. He, however, regard-

ing the theory of secondary calcification, inclines to the Head alternative of *recrystallization* or some similar process, for in *The Dental Cosmos* of June, 1927, in an article by Dr. Williams we find (p. 600) the following expression: "I am inclined to think, from certain experiments of my own, that enamel does continue to harden perhaps for years after the eruption of the teeth. But why should we suppose that the addition of any new material is necessary to increasing hardness? Have we not an almost innumerable number of cements that continue to harden, some of them for a long time, without the addition of any new material?"

It seems that we have now come to the crossroads of competent opinion on the subject of posteruptive calcification of tooth enamel, where we have on one side Dr. Head in a rather safe position with his two theories, one of recrystallization and the other of the enamel reuniting with something in the saliva; Dr. Pickerill with his very convincing theory that the hardening is due to the penetration and fixation of the calcium phosphate of the saliva; Drs. Bunting and Rickert reporting their partial success in calcifying newly erupted enamel by using commercial calcium salts, and Dr. Bodecker contributing the theory that the posteruptive calcification is a pulpal function, all arrayed against Dr. Williams's theory of chemical affinity or "tightening of the molecular grip," as he calls it. Hazardous indeed would be the undertaking for any man to intrude upon such a galaxy of the foremost leaders in dental thought and opinion without having well in hand the subject to which he would give expression. However, it is not the intention of the writer to controvert or take issue with any of the opinions quoted or with those responsible for those opinions, but rather to augment and strengthen their hypotheses and say that posteruptive calcification does occur, that it is a physiological function, and that it can be and has been accomplished artificially in cases where the physiological function has failed.

More than fifteen years ago the writer discovered that the process of secondary calcification could actually be accelerated in young patients and the enamel toned up to a point where it became hard and glossy, reducing its susceptibility to caries.

Further experimental work was conducted intermittently, as cases presented, to test the efficacy of the treatment in decalcified areas of incipient caries. Cases were sought in which white opaque spots of decalcification appeared on the labial surfaces of anterior teeth that could be readily photographed.

The following cases described and illustrated by untouched photographs have been under treatment for more than a year and show a marked reduction in the size as well as the intensity of the areas, indicating that recalcification is slowly taking place:

Case 1

Female, aged 22 years, gives a history of malnutrition and an intestinal disturbance, covering a period of three years, which has been diagnosed as chronic appendicitis.

The general condition of the mouth is fair and the indications are that the inherited resistance to disease is strong.

Fig. 1

Fig. 2

The white, crescent-shaped areas at the gingival border of the right upper lateral and cuspid were easily photographed, although other spots of lesser proportions on other teeth did not register.

This case is typical of its kind, and in all probability the spots are caused by the abstraction of the inter-rod cement substance by an acid excretion from the gingival crevice at night, when the lip is in contact with the gum and the labial surface of the tooth, forming a delta-shaped

space at the festoon, which fills with the decalcifying acid while the patient sleeps.

The surfaces of these areas are soft and pieces of the chalky enamel may be picked out of the surface with a sharp explorer as if it were plaster. The depth of the decalcification rarely exceeds 0.01 inch where the morphology of the tooth is intact (that is to say, the white opaque area seldom exceeds that depth), but in some cases the entire thickness of the enamel is undergoing disintegration right down to the dento-enamel junction.

This case was put under treatment on December 17, 1926, and Fig. 1 gives a very accurate representation of the condition at that time. On April 14, 1927, Fig. 2 was taken and clearly shows the condition as seen by the camera, indicating that recalcification has been almost completely effected.

Case 2

Female, aged 17 years, physical condition excellent, gives no history of illness since early childhood, born and raised in New York, N. Y.

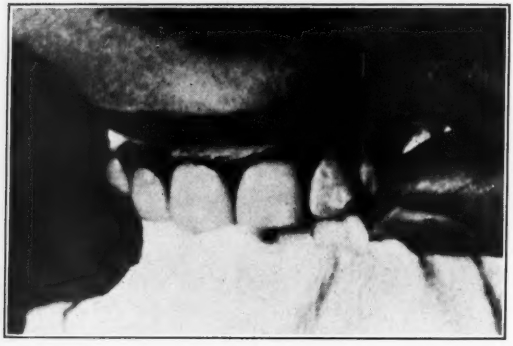

Fig. 3

Fig. 3 shows a condition which was diagnosed as mottled enamel, involving the left upper lateral (mesial third) and left upper central (incisal third). The small, round, white spot on the right central is one of those persistent things often seen in the deeper layers of the enamel and having a well-calcified, translucent veneer protection. This photograph was taken on November 16, 1926.

Fig. 4 was taken on October 29, 1927, and shows quite clearly the condition at that time. The opacity has cleared up and become translucent, nothing remaining to mark the spot but a pale yellowish tint and a very slight depression caused by the tips of the enamel rods being

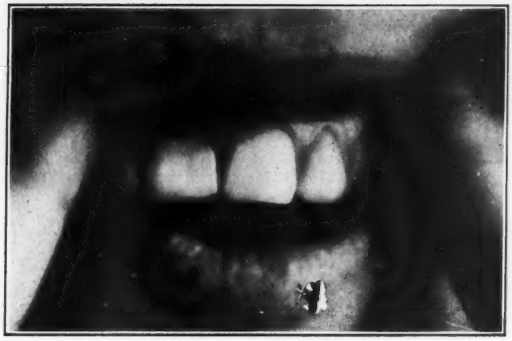

Fig. 4

broken off. The surface is hard and glossy and the yellowish tint is gradually fading. While the statement may appear premature, nevertheless the indications are that the disfigurement due to mottled enamel may be mitigated in no small degree by this treatment. The comparative rarity of these cases in this locality (New York) is the chief impediment to the accumulation of sufficient clinical data on the subject.

Case 3

Chemical Erosion

Female, aged 24 years, general history good, with exception of an occasional gastric disturbance (indigestion). The teeth have been well cared for from the personal standpoint and have required very little professional attention until recently, when the present condition began to make its appearance. Two years ago, while visiting in the South, the

Fig. 5

patient's attention was drawn to the superior laterals, cuspids and bicuspids on each side of the mouth by a sensitiveness at the gum line. This condition became worse and a visit to a local dentist elicited the information that filling was the only remedy in cases like that. He did, however, suggest as a preliminary measure milk of magnesia to be used as a mouthwash, at the same time giving as his opinion that it "seldom does any good." In a short time the sensitiveness became so acute that the application was discontinued.

It was at this juncture that the patient was referred to the writer by another patient who had previously been treated for a similar condition. Figs. 5-6 were taken when treatment was begun, early in May, 1926, and show a condition with which we are all more or less familiar,

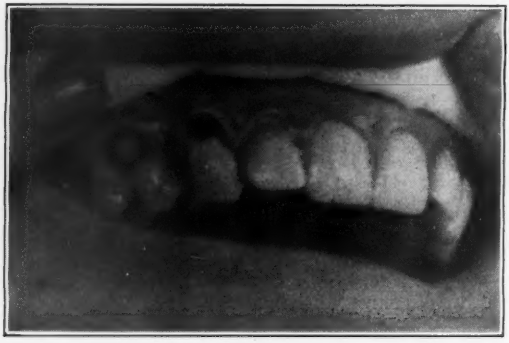

Fig. 6

and it will probably be admitted that no other condition involving the tooth surface presents a less hopeful prognosis. Figs. 7-8 were taken in October, 1927, and clearly show the improvement in the case. The sensitiveness has long since ceased to annoy and the brownish discoloration has faded to a natural cementum yellow. The surfaces are hard and glossy, as indicated by the spots in the picture on the right, which are due to high lights reflected from the glossy surfaces.

The three cases described and illustrated were chosen from a group because they presented extreme conditions and during treatment were observed by a number of professional friends.

About fifteen years ago, while making some tartar-solvent experiments, the writer discovered the calcifying properties of natural tooth substance dissolved in an acid solution. This intriguing subject was studied with much interest and a great many clinical experiments were conducted in order to establish a satisfactory working formula by which

Fig. 7

would be known the definite calcific matter content and the value of the acid solution to be used.

For obvious reasons the use of human teeth in preparing this treatment was soon discontinued and enamel taken from the teeth of beef cattle was substituted for it, which answered the purpose equally well, and which aside from being much more plentiful is not so likely to offend the esthetic sense. The process of preparation is rather involved, necessitating maceration of the crude tooth substance, washing and precipitating, weighing and measuring, then dissolving in glacial acetic acid in reducing to the usable strength of solution, which will frequently be found to vary according to the alkaline response of the patient, although most if not all patients can neutralize and react alkaline to an acid solution of pH. 5. (The action of acids on tooth enamel

Fig. 8

has been investigated by others and is beyond the scope of this paper, although much still remains to be done along this line.)

In a few extreme cases it has been found necessary to follow each application of the treatment with a weak alkaline solution in order to induce positive precipitation of the calcific matter after the desired degree of penetration has been effected. In all of these cases the patient appeared to be bordering on acidosis, caries was prevalent and accompanied by the inevitable gingivitis, while the alkaline response of the saliva was so feeble as to require assistance to neutralize a weak acid solution.

Herein lies one of our perplexing problems, that is, to know just how far we shall go in advising our patients dietward, especially when the first indications of faulty diet are observed in the mouth, when the blood fails to coagulate normally and salivary stasis permits fermentable acidity to induce inflammation of the gums and decalcification of the tooth enamel. The answer to this question is that our advice should be limited only by the extent of our knowledge of the subject of food chemistry, a knowledge in which we need not be deficient when such authorities as Howe, McCollum, Sherman and others have made it readily available.

In the final analysis foods are nothing but chemicals, and it is therefore quite possible to alter the chemistry of the body by the ingestion of foods of known chemical content. Unfortunately, the average diet is acid-forming, due to an excess of starches, proteins and carbohydrates in the form of refined cereals, potatoes, white-flour products, meat products, fish and sugars. Because of their bulk these quickly fill the stomach and give that satisfied, well-fed feeling so much desired by the intelligentsia of the quick-lunch room. To the average individual these foods are synonymous with strength and pep; that the ultimate end is acidosis, baldness, tooth decay and general debility they do not know. That green leafy vegetables, carrots, beets, tomatoes and raw acid fruits, especially oranges, will maintain an (amphoteric) acid-alkaline balance of the blood is not appreciated, and therein lies a duty of the dental profession to make known the facts.

William J. Robinson, critic and guide, writing of his European tours, says of the gypsies of Italy: "That their teeth are white as pearls is a compliment to the pearls. No pearl is as white as their teeth, and their whiteness and soundness are not due to the use of the toothbrush or to the tooth paste that lies flat on the brush, or to the priceless ingredient wrapped up in every package, for they use neither; they live close to nature and their habits are those of semi-savages." (Quotation from memory and may not be verbatim, but conveys the thought.) Here is evidence akin to that found in the study of skulls of the American Indians who died before the blight of modern civilization struck them.

Their teeth were worn down to stumps but were caries-free, and there seems to be ample evidence that baldness was unknown among them and, while the Indian was essentially a meat-eater, he did eat fruits and vegetables raw.

A diet rich in calcium is much to be desired, especially for children and young people during the period of skeletal growth and dentition, both primary and secondary. Exposure to direct sunlight with ample exercise and fresh air is necessary to a vigorous calcium metabolism, and it is calcium in solution in the body fluids which now occupies our attention. Our interest centers around the calcium content of the saliva, for it is the firm belief of the writer that it plays an important rôle in the process of "secondary calcification."

As noted in the early part of this paper, Joseph Head reported that he had rehardened ground and partially decalcified sections of enamel; H. P. Pickerill reported that he had checked up on Head's work and made some experiments of his own which led him to believe that teeth become harder after eruption, that the increased hardness was due to contact with the saliva, and that teeth could be classified as *hard* and *soft*.

Drs. Bunting and Rickert reported partial success in their experiments, in which they used saliva of patients who were found to be caries-free. The saliva was said to be high in calcium. They then undertook to recalcify enamel with solutions of commercial calcium salts, the result of which was indefinite.

There seems to be some mystery about this. High-calcium saliva, probably acid by virtue of its CO_2 content, is a calcifier, while commercial calcium salts (probably the phosphates) fail to give noteworthy results in the hands of men competent to make the tests. The inference is that there is an element (probably an enzyme) in the saliva which catalyzes the calcific matter and induces an osmotic action by which fluids in the tooth structure interchange with the fluids of the mouth.

If the saliva contains calcific matter in any form, it would indicate that the calcium intake of the individual is more than sufficient for the bodily needs, and a portion of the excess is thrown off from the blood through the salivary glands. If at the same time the saliva be acid, the acidity would in all probability be due to the presence of carbon dioxid, and the calcific matter in the saliva would then be held in true solution and available for calcification by osmotic induction into the enamel structure. With regard to this Pickerill (*Dental Caries and Oral Sepsis,* pp. 121-122) has the following to say: "We have, in fact, bodies composed of columns of lime salts, permeable at least in their outer portions, immersed in a fluid which is a saturated solution of salts

of lime, magnesium and sodium. These salts are largely held in solution by the carbon dioxid present.

"Under these conditions the lime salts by the ordinary laws of physics must be carried into the permeable enamel and there deposited —nothing else is possible under normal conditions, . . .

"Prior to eruption a very considerable hardening takes place by some 'vital' process at present not well understood, but the hardening even in native teeth is not complete at eruption; thereafter petrifaction or posteruptive sclerosis occurs by a purely physical process by reason of the warm saturated solution of lime salts in which the enamel is constantly bathed."

It is quite impossible in this paper to follow all of the ramifications into which a study of saliva would lead us. Let it suffice, however, to say that the enzymes and the colloidal buffer compounds of the saliva play a very important and mysterious part in the physiological process of secondary calcification.

Conclusions

It is the opinion of the writer, in agreement with previous investigators:

(1) That teeth differ in texture as to hardness and softness.

(2) That the teeth may become harder with age, and that the increasing hardness is due to the saliva.

(3) That the hardening process may be interrupted by a change to a faulty diet or the interposition of a disease.

(4) That in many children the hardening process fails to function in the beginning or is so impaired as to be of no effect.

(5) That prophylaxis alone, however diligently prosecuted, will not prevent caries in presence of a morbid physiology.

(6) That artificial calcification may be resorted to when the normal function is feeble or has been interrupted for any reason.

(7) That macerated natural tooth enamel, containing the calcium of the rod substance and the calciglobulin of the inter-rod substance, possesses calcifying properties to a marked degree.

(8) That as a preventive treatment this method offers possibilities worthy of extensive research.

1819 Broadway.

The Necessity of Early Diagnosis and Treatment of Cancer In the Mouth

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Leading bacteriologists, histologists and biologists in this country and abroad are devoting their time and energy in an attempt to unlock the mystery of cancer. So far the etiology of cancer and its cure are still disputed, since in a recent issue in the press we learn from men with authority that the cure of cancer will not yet be in sight, perhaps, for another century. (*New York Times,* July 18, 1928.)

With discouraging statements of this kind, obviously, suffering humanity becomes disheartened. However, let us learn to be more optimistic and make the best of what information we have gathered up to the present time. Quite a number of theories about the etiology of tumors have been considered, only to be discarded by new hypotheses. I will state a few of these theories:

(1) The Durante-Cohnheim Inclusion Theory.—That, during embryonic development and the specialization of the cells entering into the formation of organs and adult tissues, more embryonic elements are produced than are necessary, and that these cellular elements become quiescent in the tissues where they may remain, constituting embryonic rests from which, later, tumor formation takes place.

(2) That cells forming the neoplasm give up the habit of *function* and acquire the habit of *growth.* Every cell is endowed with the inherent capacity to perform some specific duty. If the cell ceases to perform this specific function, whatever that duty may be, the energy previously converted in that direction is now transferred to the reproductive capacity of the cells, thereby leading to proliferation in excess of the normal.

(3) Parasitic origin in the formation of tumors, in which metastases are conspicuous. Dr. Ewing argued against the microbic theory of cancer, declaring that it "must be ruled out of court on the ground of 'no evidence,' and because it raises more questions than it solves and is inconsistent with known facts."

(4) Growth-substance.—In the healing of wounds the body produces an abundance of cells which bear some resemblance to cancer-cells, but when the wound heals the growth stops. In persons subject to cancer the growth continues.

(5) That we receive warning of the approach of this horrible disease in certain cases and at certain times, if the patient presents himself in time. We call this the "precancerous stage," and very often we succeed in preventing the growth through an early surgical operation.

(6) The question of the heredity of cancer has been much debated.

Arthur Hunter, in analyzing family histories of cancer by the method of mass statistics, has concluded that there is no evidence of inheritance of this disease. On the other hand, positive results have been obtained by students of detailed family histories, as in the studies by Alfred Scott Warthin (1913) and others.

The studies of Lyon in the towns of Plainfield and Emdenston, N. Y., have revealed an inbred rural community in which there is a high incidence of cancer. Thus, so far, the question of heredity is still to be solved. Ewing believes that tumor-formation is a reaction to injury just as inflammation is a reaction to injury, but of a different type, depending upon individual characters or genes, which may in turn depend upon heredity.

(7) Predisposing causes.—Trauma and inflammation may predispose to tumor formation, just as they predispose to infection, and a long-continued irritation or prolonged ulceration may act only as predisposing elements. With regard to age, it may be said in a general way that physiologic activity favors the development of sarcoma; physiologic decline predisposes to the occurrence of cancer (Da Costa).

(8) Injury and inflammation appear to be, in a certain percentage of tumors, important etiologic factors. Persistent or long-continued irritation seems to favor the development of tumors belonging to the epithelial group. Numerous objections have been made to the acceptance of this theory; the most logical explanation is that of Ewing, who as previously mentioned, holds that the tumor represents a reaction by the organism to injury differing from inflammation only in type, not in principle and depending upon individual characters or genes which may in turn depend upon heredity. Foremost in precipitating this type of reaction are the various well-known physical and chemical irritants.

"You will hardly err by accepting the conclusions of older physicians that cancer of the mouth would largely disappear if tobacco, bad teeth and social disease were eliminated. A whole group of things go together to form contributing causes, and they all work together in the production of cancer." (Ewing.)

In thirty years of my experience in the many branches of dentistry I have seen a large number of cases presenting various growths on the tongue, gums (epulis), palate, lips, tonsils, lining of the cheeks and floor of the buccal cavity, etc., which were attributable, in part at least, to the following causes:

Broken teeth; ill-fitting dentures and appliances; ulcers caused by malocclusion through badly constructed crowns and bridgework; faulty root-canal work, causing abscesses and other trouble (epulis); unskilled extractions and other faulty oral surgery; broken needles left in tissues after injecting drugs; x-ray burns; the habit of biting the lining of the

cheek and lip; the use of strong tobacco, irritation of the mucous membrane of the mouth by continued use of liquor or of very hot foods or liquids; continued irritation of the gums in the treatment of pyorrhea by an incompetent practitioner, either in the process of instrumentation or by the application of powerful astringents and counter-irritants, etc.

Cancer of the lip from a protruding tooth and also teeth that are out of alignment, particularly the upper and lower third molars, are a source of constant irritation. In those who chew tobacco excessively the teeth are often worn down to such an extent that a ridge forms along the inner surface of the cheek corresponding to occlusal surfaces of the teeth. This delicate tissue is constantly irritated in the process of chewing and is the cause of many cancers.

All syphilitic lesions, leucoplakias, fissures and ulcers about the oral cavity which do not heal readily may become cancerous if not treated and cured.

Quite a few of the above-mentioned have undoubtedly played a rôle in causing cancerous or precancerous lesions. I have observed also that not rarely, in cancerous growth, the condition begins abruptly, although it usually develops insidiously with a gradual increase in the severity of all the symptoms.

Since the field is still open for suggestions and especially since the etiology of cancer is still a mystery, I take the liberty, from many years of experience and observation, to offer suggestions which will aid to a certain degree in preventing the development and progress of tumors in the buccal cavity.

The public should be advised in regard to the fact that:

(A) The cancer problem is not a hopeless one, provided an early diagnosis and a microscopic examination of tissue are made so that the condition may be definitely determined.

(B) Our chief hope in reducing the spread of this disease lies in educational propaganda, which should include the public and the dental and medical professions as well.

How often do we meet patients with cancer of the mouth in its early stages who, when conditions were favorable for a permanent cure, went to their physician or dentist for relief, only to be nursed along with palliative treatment, the patient being given a false hope of cure while the cancerous condition is progressing.

(C) Irritation in the mouth due to the causes already mentioned may predispose to cancer.

The practitioners, on the other hand, being aware of the fact that the public is becoming educated, will exercise more care in their operations.

It is the duty of the dentist to insist that patients who have suspicious lesions in the mouth return at stated intervals for observation

and to refer them to a competent physician to diagnose the case properly and promptly.

The hesitancy of the dentist and the physician in mentioning the fact to the patient that a certain lesion may be cancerous is a serious mistake. There are milder terms to apply in order to enlighten the patient of the malady before it goes too far, and by doing so very often a permanent cure will result.

Hence, education, precaution and the good work of our great and able research men who devote their time to the study of cancer will, I trust, reduce the fear of those who are pessimistic about finding a cure, and suffering humanity will be relieved from that scourge to a degree.

119 West 57th Street.

[THE CAUSE OF CARIES]

The subject which may be referred to in this connection is the causation of dental caries. Much work has already been done, and most valuable data have been accumulated. So much, indeed, that not only do we know very thoroughly how caries is caused, but we have also a great amount of evidence derived from the excellent results of preventive measures, based on the present-day widely recognized theory of causation. Strange to say, however, all this has been ignored by certain research workers, sometimes without dental, and sometimes without medical, and generally without special scientific qualifications.

—WALLACE.

The Answer—Dental Economics

By James F. Mitchell, D.D.S., Pawtucket, R. I.

What is wrong with dentistry in Oregon? *Nothing.* I would say that the author of this article should have said: "What is wrong with the dentists in Oregon?" Then I should have answered: "The same thing that is wrong with the dentists in every State—the lack of sound business training, namely, *economics.*

What is economics? Economics is the science of human wants and the means by which man obtains the things that satisfy those wants. If economics is the science of human wants, then, dentistry must be the means by which the dentist obtains the things that satisfy his wants. Dental economics therefore is simply the application of economics to the practice of dentistry.

Why is it that so many dentists object to the connection of economics with dentistry? Is it because they think it conflicts with the ethics of the dental profession? If so, they most likely have been misled by the past interpretation of the term *dental ethics.* What is meant by dental ethics? It is the obligation we owe to our profession, our fellowman and ourselves. In the past the obligation to self has been left out entirely, while the obligation to our profession and our fellowman has been overworked. It is wrong to ask exorbitant fees and thus deprive people of good dentistry, yet it is just as wrong to deprive self and family by doing dentistry at a loss. "Treat thy neighbor as thyself" does not mean that we should treat our neighbor better than ourselves. As Shakespeare said:

> "To thine own self be true
> And it must follow as the night the day
> Thou can'st not then be false to any man."

I do not believe that any state is overcrowded with dentists, neither do I believe in competition in dentistry. If you as a dentist think there is competition in dentistry, you are the one who is creating it by trying to do dentistry at a lower fee than your brother. If you would only stop and sell yourself to your patients, make them believe that you are the best dentist in the state and then sell your skill and ability at a fee that will show you a profit, you will not experience any difficulty in getting that fee. How can a dentist ascertain what fee will show him a profit? By knowing the cost of every operation. How is he to do this? By establishing a system that will determine this cost without guesswork.

In the average practice of $10,000 gross yearly, the annual expenses will amount to $4,000. If you take the expense of $4,000 and divide it by the number of productive hours you work in a year, which is about

1,000 hours, you will find you have an overhead cost of $4.00 per hour. What do I mean by a productive hour? An hour of service rendered a patient for which you receive a profit fee. The 1,000 productive hours a year may seem small to you, but when you figure on but 250 days a year and but four productive hours a day, you will see that the 1,000 hours is about right. You will not doubt the 250 days a year when you figure the following number of days off: fifty-two Sundays, twenty-six days in weekly half-holidays, fifteen days vacation, thirteen legal holidays, and a few days for dental meetings and illness. You may think you get more than four productive hours a day, but I don't believe you get that many unless you have an able assistant. I would ask you to time yourself for a few days and see if I am not right.

Did you ever stop to think of the time lost in trying to handle a great many patients in one day? Suppose you had sixteen one-half hour appointments in one day. Do you realize that you lose five minutes preparing each patient and five minutes dismissing each one? On this item there are nearly three hours lost. How many hours do you suppose you lose each day, in addition to the above, by answering the telephone, the door, and doing things that a girl could do just as well? How much time do you lose on the free-riders? Free examinations, free denture adjustments, stopping toothache and other emergency treatments without charge, when the patient is able to pay, and more than that, expects to, but you coax him not to.

How many hours a day are lost by tardy and broken appointments, for which you make no charge? All this time is deducted from the actual hours that you spend at the office, so you see, there are but a few hours a day for which you have been paid.

Accepting this fact and the fact that your overhead is $4.00 per hour (and I do not believe any practice can be conducted for less than $3.00 per hour), if you expect to receive a profit fee, the fee must be added to this $4.00 overhead.

Why not establish a minimum fee as a danger signal? What is meant by a minimum fee? It is a fee which you cannot go below and show a profit. This fee should be based upon time, the hour. I do not mean that you are going to charge by the hour, except in cases of doubt or in cases where the patient is entitled to your minimum fee. This fee should not be less than $6.00 per hour. Why not also establish a minimum charge of $2.00 for any office call, regardless of the service rendered? Stop the $1.00 and $1.50 charges. If a patient comes in for an examination of a single tooth and decides to have nothing done about it, why not charge $2.00 for the consultation? It will stop shopping and will pay you for your time. Another patient comes in to have a "plate scraped"—a plate you made six months or more ago. Why not charge $2.00 for this denture adjustment, even though

it took only five minutes. You are entitled to it. I hope you did not promise to keep those dentures fitted and adjusted for the life of the patient. Did you ever try to have any free adjustments made on your new car after thirty days? Surely your car cost more than you charged for the dentures, but you do not expect the service station to keep your car adjusted free, and your patient does not expect you to keep her dentures comfortable without paying for it. In case of extraction, why not quote a fee for the extraction plus the anesthetic, whether it is novocain or nitrous oxid? A safe fee for an ordinary extraction would be: $2.00 for the extraction plus $3.00 for novocain nerve block or $2.00 for novocain infiltration and $5.00 for nitrous oxid. Why not establish a minimum fee of $50.00 for a single denture? You cannot make one for less and show a profit. Keep account of all the time spent on one at your overhead rate of $4.00 per hour and see if I am not right. I could go through every service you render and show where you are not receiving a just remuneration.

Why not let materials be forgotten? You are not merchandisers. You are not selling gold, silver, amalgam, cement or vulcanite. You are selling service—skillful service, professional service, and service is measured by time. Keep account of the time spent on every patient and do not go below the minimum fee of $6.00 per hour. By keeping the time on every patient, it will be a guide to you in quoting estimates.

You would do well to eliminate your undesirable patients and concentrate on your good ones. Sell them some good dentistry, educate them, explain to them and charge them for the time spent in doing so. They are to benefit more than you are. You don't have to educate the masses—you will do well if you explain to one-half of your patients just what you are going to do for them and why it is best for them, etc., and let the other half or undesirable patients go elsewhere. Your patients are entitled to know for what they are paying.

To establish a system requires thought, work and determination. You must analyze yourselves, not your profession, for there is no doubt that the trouble is with yourselves as dentists. As Cassius said: "The fault, dear Brutus, is not in our stars but in ourselves that we are underlings." How is it that one dentist can do a gross business of $50,000 a year without much effort, while another strives hard, day and night, to do $5,000 yearly, and both dentists are located in the same city? Students of psychology tell us that only ten per cent of all men are truly successful.

In the application of these scientific methods to dentistry let me give you the names of six virtues that you should start to cultivate. When you have developed them your practice will show a profit.

1. *Order.* You waste seventy-five per cent of your time and ner-

vous energy because you let your work push you instead of planning your work and then pushing your plan.

2. *Punctuality.* You lose time, money, patients, friends, temper and will power because you are vague and careless about making appointments and slipshod about keeping them.

3. *Courtesy.* This has its source in consideration for others and is closely allied to tact. When some one comes to you for help, and you tell him you are sorry you can do nothing for him, or sorry to disappoint him, that's patronizing. When you ignore a caller and go on reading papers on your desk, that is rudeness. And you cannot afford either in your practice.

4. *Economy.* Your time is worth more to your practice than all other things put together. When you spend it doing what a fifteen-dollar-a-week girl could do just as well, it is sinful extravagance. It wastes not only your own time, but hers. Worst of all, it undermines your self-respect and her respect for you.

5. *Honesty.* When you connive with some patient for special cut fees, you may not intend it, but you are dishonest. Business must be done at a profit and all those who share in the privileges of buying skilled service from your office should share proportionately in paying you your profit. If anyone does not pay his share, the others have to make it up. Give everybody a square, equal deal. That will build confidence and increase business.

6. *Courage.* It is easy enough to see obstacles, to make excuses, to procrastinate. When a hard task has to be done, you will find it no help to catalog the difficulties. Just proceed with a fearless determination that will assure success and renew your interest in your profession.

The system I have partly described is not a day dream, nor is it a theory, but a good, sound, practical system, a plan I have been using in my office for nearly two years. About two years ago I took a course in dental economics and I believe such a course is the only solution to the problems confronting dentists today which sours them on their profession and makes them look elsewhere for a livelihood. I have no doubt that a course in dental economics, if earnestly followed in the office, would double any practice in three years, whether the practice is located in the smallest town or the largest city. It is my honest opinion that it is the greatest contribution to dentistry since the radiograph.

179 Main Street.

Wolf! Wolf!

By Iago Galdston, M.D., New York, N. Y.

Secretary, Health Education Service, New York Tuberculosis and Health Association

It was Elbert Hubbard who said, "Enthusiasm is like a lubricant. The proper amount facilitates smooth working; too much gums the works."

The overenthusiastic public-health worker, be he physician, dentist, or otherwise, is liable to "gum the works." His excess enthusiasm often leads him into making unsubstantiated, exaggerated and illfounded statements and claims, which when challenged bring discredit upon him, his coworkers, and upon even the most substantial elements in public health.

Due probably to the newness of the oral-hygiene movement, dentists seem particularly prone to wax excessively eloquent and "horrific" in the description of the dire consequences that follow in the wake of mouth neglect. In essence, of course, their statements are correct. They have good authority to fall back on in urging the importance of mouth hygiene. The snag comes when they indulge in particularization, when they attempt to trace the causative relationship between mouth infection and pathology engendered elsewhere in the body.

In illustration, let me quote from a "radio paper" submitted by a dentist:

"Tooth decay is a disease which destroys first the enamel of the tooth, then the deeper tissue called dentin, and if allowed to progress it reaches and destroys the nerve. If still unchecked the pus so formed goes through the end of the root of the tooth into the bone, destroying it and thus forming an abscess. This abscess, sometimes called gumboil, contains pus. This pus may spread to any vital organ of the body. It always has the same effect, that is, damage and destruction. *It causes stomach ulcers, tuberculosis, kidney trouble, heart trouble and other serious diseases.* Such is the path of disease entering the body by means of neglected teeth. Does it seem to you that we exaggerate when we say that *filling teeth in time may prevent, say, heart trouble?*

"A person dies at the age of 25 and the cause is given as tuberculosis. But was it really tuberculosis which took that life? Let us go back a few years and visualize a very common picture. The first teeth had been neglected. They decayed. Several abscesses formed and discharged *their deadly pus into the blood stream.* This was carried by the blood to different parts of the body. Due to a severe cold at some given time, the lungs were somewhat inflamed and the germs in the pus were able to attack this vulnerable spot, bringing about pulmonary tuberculosis. In a case like this, which is a more correct statement, that this

young person died of tuberculosis or of diseased teeth? I leave the answer to you.

"White bread has justly been called a crime against children. 100%-whole-wheat flour is the only flour fit for human consumption. Storekeepers will tell you that they do not keep whole-wheat flour because it becomes wormy. *White flour does not.* Not even a worm will eat white flour and yet we feed it to our children."

All of this is poor psychology, *bad dentistry,* and worse medicine!

It is bad medicine—because it is incorrect. It is bad psychology—because it exaggerates. There is an ever present danger of serious consequences following as a reaction to exaggerations in health education. Every exaggeration is a weapon forged for use by the opponents of public health and scientific medicine. The anti-vaccinationist and his cohorts, the biologic statistician and his ultra-scientific friends watch eagle-eyed for every such slip, and they are quick to take advantage of the faults of organized medicine and the public-health movement.

The public, too, in the now well-known words of Lincoln, does not long remain fooled. The man in the street soon learns to discount exaggerations, which would not be lamentable did he not in the same way discount what he should accept in full value.

The moral is that of the old, old, tale of *Wolf—Wolf,* now applied to health education, particularly to oral-hygiene education.

[ORAL HYGIENE]

In the approximal spaces we must endeavor to obtain mechanical friction by the daily use of dental floss. Of course, not the slightest trace of hard incrustation, protruding fillings and the like should be tolerated, as aside from causing chronic irritation, they prevent the brush and dental floss from reaching all the places desired. The chewing of hard food, now so generally recommended for children, cannot be too highly recommended.

—GOTTLIEB.

The Rise and Fall of Oral Hygiene In Bridgeport

By George Wood Clapp, D.D.S., New York, N. Y.

TENTH ARTICLE

IMPORTANT COMMUNITY SERVICES AT LESSENING COST

From the very beginning Dr. Fones's conception of the purposes of the preventive dental clinics reached beyond the actual cleaning and filling of teeth to the conviction that most children could be taught enough about the principles of health-giving food and personal hygiene so that they would become largely self-supporting health units, and the purpose of entrenching these ideals in the life of the community at the lowest possible cost per thousand children never left his mind. No one knew better than did he the necessity for concentrating, at the beginning of the work, on cleanings, fillings and extractions, and he knew also that much service of that sort would always be necessary. For this reason the earliest history of the dental clinic in the Bridgeport schools is a story of this form of service, with only such educational effort as could be given the children at the dental chair and in the toothbrush drills, which were the beginning of the teaching of self-help.

When this work was well enough organized so that thought could be given to planning for further advances, he began to teach the hygienists what he had learned about food in relation to dental disease, and their experience with some of the foreign-born children he confirmed, directed and extended the teaching. They observed that many of the children who grew up on a food supply rich in fresh fruits, vegetables and hard bread and poor in refined foods and sugar had broad arches, good sets of teeth and healthy gums, even if teeth and gums were entirely unacquainted with a toothbrush, while practically all other children in like home circumstances, except that their food was poor in fruits, vegetables and hard food and rich in refined foods and sugar, suffered extensive dental decay and often had narrow, overcrowded arches and unhealthy gums.

THE GROWING APPETITE FOR SWEETS

The dental profession will not long be able to ignore the fact that the appetite for refined foods and "sweets" is increasing among children and adults, and that it may have very unfortunate effects, to which that profession must be alive, and against which it must exert its influence. During this year (1928) a survey has been made in one of the schools in New Rochelle, N. Y., to determine how much money school children spend for candy, soda, etc. It may be accepted as fairly accurate because it was participated in by the eighth-grade pupils as part of the school work, and they were better able to get at the truth in such a

matter than the faculty alone would be. This school is situated in an Italian residence district, where many of the older people have difficulty in speaking good English. Much fruit and many vegetables are used, and some of the yards have gardens. These are the very people who, most of all, might be expected to adhere to their habitual racial diet, which has produced so many excellent dental arches and sets of teeth. There are about 1100 children in the school, many of them from homes where the father, who may be a gardener, a laborer or a mason, is well paid, but is by no means affluent. Yet the children in that school alone spend at the rate of $34,000 per year for candy, soda, etc., or at the rate of about $30.00 per child. What must the expenditure be in schools where the children are given much larger allowances, and what will the results be to the children?

Looking Beyond Today

Fones's vision extended beyond the children who were being served to the children who would enter the school system at some future time, and who not only would, in due course, become members of the body politic but would supply many of its leaders. He dreamed of a day when a large percentage of such children would enter the first school grade with healthy bodies, clean mouths and sound teeth.

Oliver Wendell Holmes wrote that a child's education should begin about two hundred years before it was born. These efforts did not go back quite that far, but those who made them anticipated that the finest effects might not begin to become visible for at least ten years and they might then be seen in children not born when the work began.

Preliminaries Necessary to Good Results

They realized that they must accomplish at least three things before their feet would be set solidly on the road toward the achievements of which they dreamed: (1) the dental work must impress itself upon the children as good for them and desirable for other members of the family; (2) the food principles must win the approval of the children so that they would be willing to practice them; (3) sufficient inspiration must arise from these results in the mind of each child to make him an apostle of health so that at home he would line up the family to new and strange efforts harmonious with what the school dental clinic was teaching and doing. However much literature might be sent to the homes, where many of the parents could not read English, the children must be, in those homes, the source of inspiration, of effort and of perseverance and the key to success.

Planning for Economies in the Conduct of the Clinic

This reaching back into the homes was the only way in which to

maintain the standard of service and instruction and effect economies in the cost of the clinic as the number of children in the school system increased. If the service were confined to cleaning and filling teeth, it was evident that as the city grew and the school system expanded, the annual cost would be very great, perhaps so great that the school authorities might be unwilling to continue it, but if an increasing number of children were to enter school with fairly clean and healthy mouths, the cost of the dental clinic per thousand children would be continually reduced and the clinic would make for itself a firm place in the school activities.

Moreover, because the mouth is a sensitive and fairly accurate barometer as to general health conditions, the food and hygiene habits which produced the clean mouth and sound teeth would be apt to produce healthy bodies with high disease-resistance and good recovery power.

The Expectations Begin To Be Justified

These expectations as to penetration into the homes and probable economy in clinic cost were beginning to be justified in 1924 when those features of the clinic which Fones considered most valuable were slaughtered in a political fight which had nothing to do with their merit or value. About 30% of the children who entered school then came with clean mouths and practically sound teeth. The cost of the clinic service for such children was very low.

The manner in which this remarkable change may have come about was illustrated to the writer when he was cooperating with Dr. Ebersole in the work in Cleveland. Among the children in Ebersole's class were two by the name of Semblakowsky. The writer visited their home—a tiny house, in which the parents and eight children lived on the father's earnings of never more than $12.00 per week. Mrs. Semblakowsky, who was very enthusiastic about the benefits her children had received, tried to explain how it was that all the other children in the family also had clean teeth. Her English was broken but vivid. Seizing a couple of youngsters who happened to be about, she stood them in front of the sink and said: "Evey day my Bertha, she line ze chilluns up to ze sink and makes zem scrub ze teeth till zey shines like eveyting," and she illustrated with movements much like those with which, in my youth, the old folks used to shine the kitchen stove. My suspicions that one or two brushes did duty for all the children were submerged in admiration of the shining teeth of the children she lined up.

A Demonstration of Tremendous Importance

When the dental clinic had been in operation about four years, the influenza epidemic descended upon us. It should have found in Bridge-

port a vast amount of susceptible material. The oncoming of the War and the sudden and great expansion of the city as a munition- and machine-making center had drawn in a very large number of foreign-born workers and their families, many of whom lived under unhygienic conditions.

When the scourge became severe, most cities closed their schools and got the children out of doors. Bridgeport did just the opposite. It kept its schools open and got the children into them. The teaching of the then well-established food and hygiene principles by the hygienists was intensified. The City Health Officer inaugurated an educational campaign in theatres, motion picture houses, etc., regarding the contraction and spreading of influenza. The death rate was the lowest known to have been recorded in any city approaching the size of Bridgeport—5.2 per 1000 people.

Dr. Walter H. Brown, then City Health Officer, stated that during this period an intelligent background for this education had been prepared by the regular work of the dental clinic in instructing children individually and in distributing thousands of hygiene pamphlets in the homes, for the enlightenment of the parents, regarding common ways of spreading diseases and the hygiene of prevention. Five years of such education in conjunction with mouth hygiene played an important part in giving the citizens of Bridgeport as a whole a more intelligent impression regarding contagious diseases, and the Health Officer and his coworkers had a more enlightened public with whom to work. He states further that "the most important side of this work is the educational opportunities afforded the hygienist. She is an important factor in raising the sanitary intelligence of the community, which is, after all, the object for which modern health-workers are striving."

The Board of Health or the Board of Education

Dr. Fones originally desired that the school dental clinic should be conducted by the Board of Education, but the prejudice of that board in favor of a corrective clinic under the control of one of its own members made that impossible. It was not until the Board of Health, inspired by Dr. Wm. J. McLaughlin, agreed to sponsor the clinic that his plans for preventive work could be made effective. The clinic was therefore under the direction of the Board of Health. This relationship was satisfactory during the earliest history of the clinic when the service consisted of cleaning, filling and extracting teeth and giving toothbrush drills in the classrooms.

The Bridgeport Board of Health functions, in the schools, through the City Health Officer and his medical representative and nurses. They exercise a general supervision over the health of the children, make physical inspections from time to time, detect and diagnose cases of

contagious disease and supervise the treatment, at least in some cases. While the Board of Health has access to the schoolrooms at all times, it is not a teaching body, it has no place on the teaching program and, when opportunity offered, its nurses were not equipped to teach diet and personal hygiene in the health program put into operation by Prof. Cortright.

The Gathering of the Educational Forces

The story which has been told has shown how, as the original conception of the clinic began to unfold more and more, the hygienists were trained in dietetics and pedagogy, so that they might present material of the highest health value in the most effective manner. Their adroitness and initiative were illustrated by the *Story of Tiny Tim,* the Food Fun Game, the booth at the school fair, the songs, all of which have been described, and in many other ways of which space does not permit the story to be told. The enthusiastic reception of these activities by teachers and children indicated that the instruction in classrooms would increase and would become steadily more important.

Other educational forces were gathered. The State of Connecticut, disturbed by the physical showing of many of its young men when examined for military service, passed legislation requiring that 2½ hours of physical training be given each school child each week, only one-fifth of which was to be spent in health instruction, and placed this activity under the boards of education. So strongly was this the trend of sentiment throughout the country that, in nearly 80% of all communities where the record of such legislation was known, the board of education was designated as the acting body. More and more the responsibility of preparing a sound little body to be the home of a sound little mind was being placed upon boards of education instead of on boards of health.

The health program initiated by Prof. Cortright in the Bridgeport public schools was now becoming effective. It called for three hours of health instruction and two hours of physical education and games; that is, it was twice as extensive as that prescribed by the State. It utilized the dental hygienists as teachers of dietetics and hygiene, and this led them still further into the classroom activities of the schools.

Here, then, were two great health movements, the dental clinic and the school health-program employing many of the same teachers and directed for the benefit of the same children. One was under the Board of Education, the activities of which were almost entirely educational, and the other under the Board of Health, the activities of which were almost wholly corrective. This led to many unnecessary and uneconomical complications.

The Appeal to the Board of Apportionment

In June, 1921, those responsible for the conduct of the oral hygiene clinic appeared before the Board of Apportionment and asked that the appropriation for the support of the clinic during the year to come be granted to the Board of Education rather than to the Board of Health, so that all the teaching activities might be better integrated. Public hearings were held on the subject, at which representatives of both boards urged their claims, but in the end the appropriation of $42,000 was granted to the Board of Education.

On April 1, 1922, the two supervisors, twenty hygienists and two dentists employed in the dental clinic in the public schools became employees of the Board of Education.

And then the stage was all set to achieve better correlation of effort, bigger results and greater economies.

(We are accustomed to speak among ourselves of dental service as of great value, but few of us think of a school dental clinic as a source of wealth in a community. Yet that view is well worth taking, especially when presenting the case for a clinic to a board of education or to the leaders in any community.

The next article will offer evidence that the dental clinic in the public schools of Bridgeport was, in its time, the greatest potential source of wealth of that rich and busy city.)

Porcelain Manipulation

A Practical Technic for the General Practitioner

By F. R. Felcher, D.D.S., Chicago, Ill.

XIX

GLAZING

We now arrive at a subject in connection with ceramic dentistry which is becoming recognized as vital, viz., ceramic dental restorations which have been ground.

It is a fact that all porcelain is more or less porous and, once ground, cannot be polished.

Close examination of porcelain to which a polish has been applied will show minute pores. These pores not only harbor bacteria but tend to irritate the tissues to a certain extent. When ground porcelain is placed in occlusion, a great tendency to wear the opposing tooth will be noticed. This of course encourages malocclusion and the subsequent results therefrom.

It is obvious, therefore, that where porcelain which has been vitrified is ground, the use of a material to glaze or cover the pores becomes a necessity.

Glazes used for dental purposes should be able to withstand the catalytic action of mouth conditions. In simpler words, they should be insoluble in the mouth. They should not discolor and should be transparent after firing, so as not to interfere with the color of the work to which they are applied. They must form a perfect union with the tooth for which they are made, and must be able to withstand the stress of mastication without chipping or flaking.

It is common practice in ceramic manufacturing where pottery, chinaware, etc., are made to use glazes to seal the pores of the porcelain. Some of these glazes fire at temperatures varying from 1700° to 2350° F., being of materials to suit the various needs of the articles. Some glazes contain colors, giving colored enamel effects.

In dentistry it is necessary that the glaze to be used be of a firing range sufficiently beneath the vitrifying point of the tooth as not to cause overfusion of the tooth.

There is on the market at the present time a glaze which fires at the fusion point of pure gold (1945°), and which fills the requirements for all teeth except those teeth used in denture construction which have gold-encased pins. As the latter teeth cannot be fired at a temperature higher than 1600°, due to oxidization and burning out of the solder, a lower-fusing glaze must be used, and this can be obtained.

As some low-fusing porcelains contain certain fluxes acted upon by

secretions of the mouth, in the opinion of the author the higher-fusing glazes should be employed wherever possible.

The use of very low-fusing porcelain is not recommended for glazing for the above-mentioned reason and because the application of any quantity sufficient to cover the ground portion completely tends at once to increase the size of the work and creates a disadvantage worthy of consideration.

To sum up the subject in order to discourage the application of ground porcelain in the mouth, all teeth should be glazed after grinding. By so doing the operator will have an opportunity to place restorations which will not harbor bacteria, cause irritation to tissue nor tend to stain, and will prevent excessive wear of opposing or contact teeth.

Mention may here be made that a furnace is obtainable which is moderate in price and which can be ideally used for the higher-fusing glaze. While it is not indicated for use in firing porcelain, its heat range, which is about 2000°, enables the use of a pellet of pure gold to check the temperature in the muffle.

Technic for Glazing

The tooth is first ground to position, the grinding being accomplished either by a stone running in water or dry, as preferred. After grinding, the tooth should be thoroughly disked, first with a coarse and later with a fine disk. Then wash. This may be done with a brush and some soap and water. Now dry with a clean napkin, taking especial care to keep the fingers away from the porcelain.

Place the tooth in a suitable holder, then apply a dry napkin to some of the dry glaze and rub the glaze over the ground portion. This is to help fill the minute pores.

Now make a thin, creamy mix of the glaze on the slab by mixing with clean (preferably distilled) water.

With a small camel's-hair brush, apply the glaze over the tooth, using a light stroke and passing from the top of the tooth toward you, avoiding thick areas or streaks. It is vital for the success of the work that this be done.

Now heat the work in front of the muffle door, placing it in the muffle when it is sufficiently heated so as to prevent cracking, and fire to the proper temperature. Remove and anneal by allowing it to cool under a glass.

Usually two applications of glaze are necessary to complete the work successfully. The second application of glaze is applied with the brush and the creamy mix of glaze but without the necessity of the dry powder rub. Fire as usual.

Glazes are not porcelains and should never be used for build-ups.

7616 Phillips Avenue.

Is There Metabolism In Enamel?

By H. H. Cleaveland, D.D.S., Springfield, Mass.

For some time prior to 1899 I was under a good deal of nerve tension and became unusually fatigued. In that year I noticed incipient caries on the buccal surfaces of a number of teeth in the form of crescents, the gingival margins of which ran about parallel with the festoons of the gum. The enamel in the crescents was white and very soft all the way through to the dentin, as I found by using an excavator on the lower right first bicuspid. The crescents were about 3 mm. wide, vertically, at the widest places.

I believed this occurrence to be the result of overwork and immediately changed the order of my life in such way as to relieve some of the nerve tension and get more rest. Without any special thought on my part my diet was somewhat changed at the same time by the addition of more milk and vegetables. I did not attack any of the other teeth with excavators. As the teeth were free from deposits, they needed no treatment. Within two years the white crescents had entirely disappeared and the enamel which had been white was of the same color as the rest of the enamel. The place where I dug in with the excavator was never filled and has never decayed.

In 1913, as a result of a period of overwork lasting about five years, the same condition returned in the same location on many teeth. I recognized it as similar to the other condition and immediately rearranged my life to get a complete rest. It disappeared in about two years.

In fifteen or twenty cases I have been able to recognize signs of an incipient nervous breakdown on the part of patients by a change in the appearance of some portions of the enamel. It becomes much whiter and softer. When patients whom I have advised on the basis of such an appearance have taken adequate rest, the general breakdown has been avoided and there has been no unusual amount of decay. When they have declined to take the rest or have taken insufficient rest, the general breakdown has occurred. It has been marked in the mouth by rapid and extensive decay.

I recall particularly the case of one physician who joined the A. E. F. and was for a long time under high nervous tension because of the character of his service. In eight months, in spite of good local care of his mouth extensive caries developed. He was demobilized early, recovered his nervous balance, and since that time has not suffered from caries.

Is there metabolism in human enamel in spite of the disappearance of the enamel-forming organ? If not, what has, on two occasions,

softened my enamel so that, without effort, an excavator could be thrust through it, and, more significant, what has caused it to become as hard as the rest of the enamel and like it in color?

If the action was local, why did not the hole I made in the lower right first bicuspid, near the gum, 29 years ago, decay? Surely it has offered an excellent lodging-place for starches, bacteria and nascent or free acid.

If a local action dissolved out the lime salts, what put them back?

14 Chestnut Street.

Appointments to Dental Corps of the U. S. Navy

A competitive examination for appointment to the Dental Corps of the U. S. Navy will be held December 3, 1928, at the U. S. Naval Medical School, Washington, D. C. Appointees must be citizens of the United States, between 21 and 32 years of age at the time of appointment, which may be one or two months later than the date on which the examination will be completed. Candidates must submit with their applications certificates of birth and citizenship, or graduation from an accepted high school, or the equivalent, and from a dental school, and two or more letters testifying to good habits and moral character. Applications should be addressed to the Chief of Bureau of Medicine and Surgery, Navy Department, Washington, D. C. The examinations will be both theoretical and clinical and the usual duration is from seven to ten days. No allowance can be made for the expense of persons appearing for examination.

E. R. Stitt,
Surgeon General, U. S. Navy.

CORRECTION

In the last paragraph of Dr. DeFord's Article "Reminiscences—Mostly Anesthetic" on page 637 of The Dental Digest for September, the last sentence should read: "Never in our lives in analgesic cases ....."

Oral Surgery In Practice

By James L. Zemsky, D.D.S., New York, N. Y.
Attending Surgeon, Department of Oral Surgery; Chief of Clinic and Director, Surgical Periodontia Department, Midtown Hospital, New York

(*Continued from September*)

APICOECTOMY AND REPLANTATION

Apicoectomy

¶270. Successful apicoectomy depends in great measure upon the proper selection of cases. This requires a consideration of the amount of bony investment of the teeth in question, as well as root-canal therapy. (See Figs. 289-301.)

Fig. 289

Fig. 290

Fig. 291

Figs. 289-291

Roentgenograms of a patient, 17 years old, who developed an acute infection in the region of the mandibular centrals and laterals. After the pus had been evacuated and the acute stage reduced to a subacute condition, the root canals were filled and amputated, as shown in Figs. 290-291.

Fig. 292

Fig. 293

Figs. 292-293

Roentgenograms of the teeth shown in Figs. 289-291 after the root ends were amputated. These were taken five and eight months after the operation.

Fig. 294

Roentgenograms showing a cystic area involving the maxillary canine and premolars.

Fig. 295

Roentgenogram showing an unsuccessful attempt to fill the root canals of the teeth shown in Fig. 294. (See ¶270.)

Fig. 296

Roentgenogram showing another attempt to fill the canals. Note the perforation of the roots. This case proved to be a failure because of unsuccessful root-canal therapy. (See ¶270.)

Fig. 297

Fig. 298

Fig. 299

Fig. 300

Fig. 301

Figs. 297-301

Roentgenograms showing several stages in the process of root-end amputation. The patient was a twelve-year-old boy. The operation was performed seven years ago and to all appearances is successful, if we judge from the film taken recently, as shown in Fig. 301. (See ¶270 and ¶276.)

¶271. To prevent splitting the root, the apex should be removed—not with a chisel but with a bur cutting it either across or from the end downward.

¶272. Failure is likely to follow apicoectomy if resection of the root is attempted before it is *well* exposed to view.

¶273. When the bony cavity surrounding the root apex can be kept dry, the exposed root end should be touched up with silver nitrate and then either precipitated with formalin (Howe) or burnished with a hot egg-burnisher.

¶274. Before the flap is sutured, the walls of the ebony cavity and the soft structures surrounding the amputated root should be scarified to encourage bleeding. After the cavity is filled with a blood clot and the flap is well coaptated, the latter should be retained in proper position by means of sutures.

¶275. Infected areas presenting pus either before or after apicoectomy require drainage. If the wound has been sutured, the sutures must be removed and iodoform gauze strips packed into it. The dressing is to be continued until all signs of suppuration disappear, and the wound is then allowed to heal by granulation.

¶276. Successful apicoectomy will be followed by regeneration of bone. This may be readily seen on roentgenograms taken at various intervals. (See Figs. 301-308.)

Fig. 302

Fig. 303

Fig. 302

Roentgenogram showing a cyst involving maxillary central and lateral incisors.

Fig. 303

Roentgenogram of the same teeth as shown in Fig. 302. This was taken after the root canals of the central and lateral shown in Fig. 302 were filled.

Fig. 304

Fig. 305

Fig. 304

Roentgenogram of the same case as in Figs. 302-303 showing root ends of the central and lateral amputated.

Fig. 305

Roentgenogram of the same teeth as in Figs. 302-304 four months after the operation. The bone is not yet completely regenerated in the region of the lateral, but is fairly well filled in around the central.

Fig. 306

Fig. 307

Figs. 306-307

Roentgenograms of the same case as in Figs. 302-305 showing the condition before and after root amputation. Judged from the roentgenogram, the results are good. (See ¶276.)

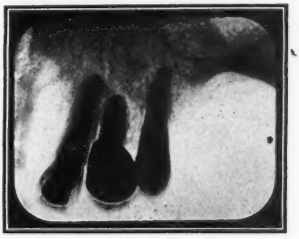

Fig. 308

Roentgenogram showing excellent results following root resection.

¶277. Radiolucent areas which can still be seen on roentgenograms of teeth with resected roots a year or more after such an operation has been performed indicate the presence of infection and require extraction of the amputated teeth. (See Figs. 296, 309-310.)

Fig. 309

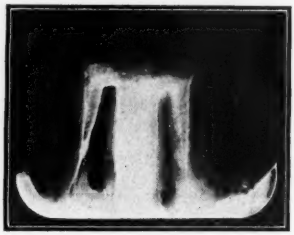

Fig. 310

Figs. 309-310

Roentgenograms showing unsatisfactory results following root-end amputation. (See ¶277.)

Replantation

¶278. Single-rooted teeth which have been either accidentally knocked out or extracted in error may be replanted. (See Figs. 311-314.)

Fig. 311

Roentgenogram of the maxilla of a boy, 14 years of age, with a missing right superior central, which was lost in an accident. (See ¶278.)

Fig. 312

Fig. 313

Figs. 312-313

Roentgenograms of the knocked-out tooth (see Fig. 311) before and after the root canal was filled. (See ¶279-280.)

Fig. 314

Roentgenogram of the tooth shown in Figs. 312-313 after it was replanted.

¶279. A tooth which it is intended to replant must be sterilized and thoroughly filled.

¶280. The following steps carefully carried out in replanting a tooth may add to the success of this not always successful procedure:

(1) The area to be operated upon should be anesthetized by the conduction or infiltration method.

(2) The socket must be thoroughly curetted.

(3) The tooth should be well filled and sterilized before it is securely splinted in its socket.

¶281. Roentgenograms of the areas in which a tooth has been replanted should be taken from time to time, and when resorption of the root is revealed, the tooth should be extracted. (See Figs. 315-319.)

Fig. 315

Fig. 316

Fig. 315

Roentgenogram of the same case as in Fig. 314 taken six years after the operation. The root is completely resorbed. (See ¶281.)

Fig. 316

Roentgenogram of a replanted mandibular right canine one year after the operation.

Fig. 317

Roentgenogram of the replanted tooth shown in Fig. 316 three years after the operation. Note the resorption of the root apex, which clearly indicates a failure.

Fig. 318

Fig. 319

Figs. 318-319

Roentgenograms of replanted teeth showing resorption of roots and areas of rarefaction, indicating failure. (See ¶281.)

355 East 149th Street.

(To be continued)

What, Then, Is Dentistry?

By F. Albert Donlan, M.D., Cresson, Pa.

Reconstructive or restorative measures have in the hands of the dental profession reached a point of efficiency highly commendable. Technically and artistically development has progressed rapidly during the past ten years. The sculptor's work calls for the finest artistic touch. He imparts grace, beauty and expression, a living image, a masterpiece. The engraver's hand is more or less technical. It demands symmetry and exactness. The lens-maker's part is precision. All three are guided by well-known principles and the faculty of the mind. It is the latter which gives the new creation expression and individuality.

What, then, is dentistry? Does the name signify the science in the mind of the layman? As with all other professions we have to include the chaff with the wheat. The process of elimination beyond a degree is an endless one. Education and evolution of the science have developed a greater clinical interest. To create a widespread or more uniform public confidence should be the slogan. How can this be accomplished? Not until the middle-man or the man of mystery, be that what it may (egotism, pride or estrangement), is eliminated and the daily cooperation of doctor and dentist is encouraged.

The science of dental surgery like that of the practice of medicine does not tend toward adolescence. On the contrary, it always tends toward infancy. In reviewing old manuscripts one will find plenty of incentive for new thoughts. Teach the layman that dentistry is more than a few steps from the machine shop. At one time the layman believed that the dentist's purpose was exclusively the alleviation of pain. The idea was deep-seated, and although it is not common at the present day, it is not rare. Pain and dentistry are symbolic if the number of extractions over a given area and period is taken as a basis for statistics. The layman should be educated to the belief that a mouth full of gold may mean a sea of trouble. He should be told that the tooth is a vital structure, that it is ornamental and serves a very useful purpose. It dies from misuse and abuse, whether as a result of the individual's indiscretions or meddlesome interference.

Violent sepsis may be the result of an error in judgment. In this respect the dentist's task in dealing with the tooth is not unlike the surgeon's in dealing with the abdominal cavity, namely, knowing when, where, and how to drain. The heroic efforts of skillful surgery have demonstrated the dramatic effects of injudicious dental surgery. Saving a tooth and losing a life is the personification of false economy. Draining a tooth and prolonging life is the height of efficiency; it is skill personified.

Stealing dignity from synonyms is an old game. The fastidious

barber has taught his clientele to know him as a tonsorial artist and therefore they patronize him because of his modern ideas. The old-fashioned doctor—or horse and buggy—has become antiquated, and instead we have the modern clinician. The "peddler," although still in the ranks of the medical and dental professions, is being replaced with speed and accuracy by none other than the diagnostician. The definition of dentistry in the dictionary is: One who cures diseases of the teeth or inserts artificial teeth. This definition, or more important, this popular belief is too elementary. It is not expressive of the art. The requisites for a dental surgeon are: an abundance of clinical sense, perspective resources, and a good technician. The definition, in other words, is too comprehensive to be permitted space outside of an encyclopedia.

Unlike the sculptor, the engraver and the lens-grinder, you are dealing with the living, the vital. Your art demands the combined efforts of the three, plus clinical judgment. It calls for *harmonics* to be *harmonious,* without which there is no *harmony.* Reconstructive or restorative processes must first, last and all the time be built upon a fundamental base—a principle, namely, *Preventive Health.* Do not tolerate "buck-passing." Be yourself and be original. Develop sound clinical judgment—and capitalize it!

801 Front Street.

[TOOTH ANATOMY]

The great thing necessary, we believe, is for the dentist to learn something about tooth form. There are many men who could not carve a tooth that would be recognized as such. We are glad our colleges are giving more thought and study to this and are now offering their students a thorough course in this very important subject.

—MITCHELL.

Togo's "Discursions"

Mr. Editor of Dental Magazine Exhibiting Considerable Vitality.

Hon. Sir:

Recent personal attendance at 70th Annual Session of A. D. A. as perpetrated in beautiful city of lakes and flour mills gives rise to several thoughts some of which will be verbally illuminated if possible; Thank You! Housing of entire National meeting in large fire-proof Auditorium was perhaps best ever accomplished in history of such endeavors; however, many previous mistakes were cheerfully repeated in less intense form as per following specifications. All "Section Rooms" were too long and narrow with ventilation almost entirely lacking; result, 10% of audience rapidly converted to state of glassy-eyed somnolence or sound sleep. Why such conditions continue to be encountered is probably well understood by all members of Arrangements Committee, but remain complete mystery to Hon. Average Member in yearly attendance.

Non-partizan and non-professional address delivered by Hon. Glenn Frank was noteworthy effort in line of sound analysis of basic problems of Professional Education and Service, but was successfully and adroitly overlooked by at least 80% of all members of A. D. A. who flocked in large numbers to witness "A Night in Spain" at largely increased cost per capita, thereby escaping exposure to moral obligations or other substances considered undesirable when absent from distressing confinements of Homeburg, Iowa, or other rural residential cities.

Many commercially valuable and instructive lessons could be painlessly extracted from foregoing and sundry other desultory occurrences, but one observation in particular will possibly exhaust vocabulary and space limits available for high colored month of October, namely and as follows: Fair presumption points unmistakably to fact that cross-section of Dentists in attendance at National Convention would assay considerably higher in all desirable qualities than similar cross-section of entire profession as practicing in U. S. A. Stated otherwise, it is principally from upper 50% of professional standing and ability that attendance at any National Meeting is recruited. Foregoing observation is necessary in order to add interest to statement immediately following, which is the distressing fact that high percentage of bad mouth conditions were plainly noticeable as one mingled with Hon. Average Member in National Convention Assembled. Proud and well-founded boast of Modern Dentistry is that practically anyone with sufficient desire and reasonable amount of cash money can have teeth of good and attractive appearance. In spite of said fact distressing instances were only too frequently observed where personal tooth con-

ditions of D. D. S. to be plainly noted would have been regarded as disgraceful by any properly up-to-date and self-respecting motorman or bricklayer. Gold shell crowns gleaming in Minnesota sunlight from upper laterals and cuspids; wide open spaces left by missing upper bicuspids where sound molars were plainly present to offer permanent inducements for bridge restorations; broken corners, discolored interproximal surfaces, unkempt and discouraging appearances of all kinds were frequently encountered in all sections and were entirely absent in none.

Thought germs arising in connection with noticeable facts as stated are several. Many forms of advertising are barred by accepted ethical standards of all Professions; it therefore becomes of utmost importance to all Dentists to show Hon. World and his Wife in every possible way that they are personally convinced of importance of clean and attractive mouth appearances and proper tooth functioning. How can such impression possibly be conveyed convincingly by a man whose personal mouth presents grotesque, unattractive or actually dirty appearance? How can a man with gold shell crown on one or both upper laterals proceed to logically explain superior merits of porcelain jackets to prospective patron in need of same? How can any Dentist in plain and personal need of one or two bridges call $250.00 worth of attention of Hon. Patient to similar discrepancy when found to exist? How can a man in personal need of 57 varieties of Dental Prophylaxis sell one or two sorts of same service to Hon. Patient without grave danger of inducing attack of loud coarse laughter which may terminate fatally to all further proceedings?

Young ladies making specialty of manicuring invariably have well-kept hands and nails; barbers wearing full beards are extremely scarce article in realm of U. S. A. Dealers in high grade automobiles seldom personally drive dilapidated road louse of 1918 extraction; but entirely too high percentages of Dentists continue to silently advertise personal lack of appreciation of importance of really High Grade Dental Service by personally tolerating obviously obsolete tooth effects which can produce only feelings of disgust or distrust in minds of all intelligent Patients possessing brains of ordinary H. P.

Hoping you are the same,

Yours considerably,

Togo.

DIGESTS

WHEN SHOULD TREATMENT BE BEGUN?

By Harry E. Kelsey, D.D.S., F.A.C.D.

There has always been a tendency to express the time when orthodontic treatment should be begun by a certain period in growth, and the one that has been most generally accepted is that time when all the temporary teeth have been lost and the permanent ones (except the third molars) erupted.

According to Dr. Kelsey, the time to begin treatment is when, through observation and experience, one is convinced that the case is developing along abnormal lines and that there is a deviation from the normal that is growing worse and that cannot be overcome except by outside interference.

A new case is kept under observation for some time before any treatment is instituted. Then conditions are treated as they present with periods of rest in between, and in this way the patient is spared the inconvenience of spending all of his early life wearing appliances. —*The International Journal of Orthodontia, Oral Surgery and Radiography,* July, 1928.

THE INTERRELATIONSHIP OF THE SPECIALTIES OF ORTHODONTIA, OTOLOGY, OPHTHALMOLOGY, RHINOLOGY AND ORTHOPEDIC SURGERY

By Robert H. W. Strang, M.D., D.D.S.

"(1) The fields of otology, ophthalmology and rhinology are interrelated with that of orthodontia embryologically, anatomically and physiologically.

"(2) Unsolved questions in etiology concern all and should be subjects for mutual study and research.

"(3) Interest in bone deformities brings the orthopedist and rhinologist into closer relationship with the orthodontist than is the otologist or ophthalmologist.

"(4) The rhinologist relies on surgery for the treatment of these bone deformities. The orthopedist and orthodontist attempt by mechanical means to restore normality to tissue perversions of form and function.

"(5) From the orthopedist we learn the following helpful facts:

(a) Bone deformities are of functional origin, often due to normal stress working on unhealthy bone or to the compensatory attempts of nature to normality to tissue perversions of form and function.

(b) The problem of treatment is to restore conditions to normal, and permanent results depend upon maintaining normal muscular function thereafter.

(c) A complete understanding of the mechanism of the affected part is absolutely necessary to intelligent and successful treatment.

(d) Deformities should be overcorrected to allow for tissue 'comeback.'

(e) Failures are due to lack of understanding of the true nature of the deformity and of the practical details of treatment."—*The Dental Cosmos,* August, 1928.

THE RELATION OF MOTTLED ENAMEL TO CARIES

By Frederick S. McKay, D.D.S.

The idea that the integrity of the enamel structure is the chief factor in determining whether or not decay will occur is widely accepted. This accounts for the statements urging the addition of calcium and vitamin-bearing foods to the diet to increase the resistance.

The term *poorly calcified* has been used in a very loose manner. It is generally applied from clinical observation only and not from microscopic and chemical examinations. Enamel is found to be uniformly normal. It has no living cells, and the formative elements have become calcified and functionless.

Caries, as applied to the enamel, is a misnomer. It should be termed *decalcification.* How can it be said that an inert calcific mass has resistance against the solvent action of lactic acid? What material could be brought into the enamel that would modify the affinity of lactic acid for calcium? The term *resistance,* as applied to biologic function, implies an active cell process, and enamel is entirely passive. Teeth decay not because the enamel is poor but because of this affinity of lactic acid for calcium.

Mottled teeth contain the poorest calcified enamel of which there is any record, yet from observation these teeth are no more susceptible to decay than those that are considered normally or perfectly calcified. In fact, in some districts they are singularly free from caries. Where, then, is the resistance? Is it to be measured in adverse ratio to the integrity of the structure?

Mottled enamel further proves that the structure of the enamel can only be altered during the formative period. This water-borne influence is the only example in dental pathology of damage to the enamel through a dietary error.

It must be concluded that a circulation through the enamel capable of exercising a metabolic influence toward further calcification has not been proved, and that diet cannot influence the susceptibility to caries. —*The Journal of the American Dental Association,* August, 1928.

VINCENT'S DISEASE

In 1896 a Frenchman, Vincent, described a bacillus found in certain types of ulcerated tonsils. Later it was found that a spirochete was associated closely with the bacillus, and that the disease was not confined to the tonsils but occurred throughout the whole oral cavity. It became especially prevalent during the World War, attacking chiefly the men confined to the trenches, consequently the term *trench mouth.*

Since the War it has spread throughout the country and is increasing rapidly. Serious and sometimes fatal streptococcic infection together with gangrene may occur when it is neglected. Bloodgood states that it never occurs in edentulous mouths.

Diagnosis is easily made from swabs from the infected areas. Neglected mouths with carious teeth and inflamed gums, syphilis and cigarette-smoking are predisposing causes.

Sodium perborate used as a thick paste in the mouth and in a 2% solution as a mouth wash is the most effective treatment. Bloodgood claims that this will rapidly cure 95% of the cases.

Methylthionine chloride in full strength powder applied to all parts of the mouth by the dentist has proved effective and in obstinate cases one injection of arsphenamine is generally sufficient.—*The Journal of the American Medical Association,* July 28, 1928.

THE INFECTED VITAL DENTAL PULP

By Kurt H. Thoma, D.M.D.

"1. All teeth that have been painful or very sensitive to hot food should be carefully investigated, because such teeth often have infected vital pulps.

"2. The fact that a tooth reacts positively to so-called vitality tests, or is sensitive when opened up, or painful when the pulp is exposed, does not prove that the pulp is not infected.

"3. A more careful study of the roentgen picture is necessary. If a large number of root-filled teeth, with or without infection, are

present, they often distract attention from the small changes giving indirect roentgen evidence of an infected vital pulp.

"4. In addition to the roentgen examination, a clinical examination of all suspected teeth should be made.

"5. The use of a dental diagnostician should be encouraged. He would act as a consultant with whom the various aspects of the case could be discussed. The general practitioner should find it of great advantage to employ the services of one of our well-trained specialists rather than to send his patients to a commercial x-ray laboratory, where men with questionable professional qualification make business of one of the most important branches of dentistry.

"6. An infected vital pulp, no matter whether there are well marked periapical changes or not, is often a very important focus of infection. Its removal gives promise of prompt relief of the systemic condition."—*The Journal of Dental Research,* August, 1928.

DIAGNOSIS OF PERIODONTOCLASIA

By F. V. Simonton, D.D.S.

According to Dr. Saxton Pope, disease originated with life itself, and after a careful study Dr. Simonton states that dental caries is not peculiar to man or domesticated animals, though domestication and civilization have greatly increased the etiologic factors. Both caries and pyorrhea occurred in primitive and prehistoric man. Dental disease occurs and can be produced experimentally in the lower animals.

Susceptibility to pyorrhea can probably be inherited through a reversal of evolution (the preservation of the unfit) and through inherited variations in the chemistry of the tissues.

Among civilized men inflammation of the gums is practically universal. The white matter that collects around the teeth is chemically and bacterially irritating and leads to inflammation. However, it has been observed that superficial gingivitis may occur from purely endogenous causes, and non-infectious inflammations are sometimes present.

The non-inflammatory type of parodontoclasia may be seen in dogs when the diet contains an excess of basic ions, and the microscopic appearance of the tissues resembles the diffuse atrophy described by Gottlieb.

The alveolar process is a very labile tissue, and destructive and constructive changes are in progress all the time. The clinical study of the changes of the bone is dependent on the use of the x-ray, but dogmatic assertions should not be made from the findings shown by this single method.—*The Journal of Dental Research,* August, 1928.

PRACTICAL HINTS

This Department is now being conducted from the office of The Dental Digest. To avoid unnecessary delay, Hints, Questions and Answers should be addressed to Editor Practical Hints, The Dental Digest, 220 West 42d Street, New York, N. Y.

NOTE—Mention of proprietary articles by name in the text pages of THE DENTAL DIGEST is contrary to the policy of the magazine. Contributions containing names of proprietary articles will be altered in accordance with this rule.

HOW TO REPLACE VULCANITE—W. H. M. in the June issue of THE DENTAL DIGEST wanted to know how to replace old rubber. He does not say whether he is refitting a denture or not. In the event that he is I will give him the full technic.

Take an impression with the old plate. Any method preferred may be used just so that it doesn't change the occlusion. Invest in the lower part of a flask as you would a new case except that all of the rubber is covered with plaster. Just leave the teeth exposed. As soon as the plaster sets, before it dries, heat the teeth with a flame until they can be pushed off easily. Use a little judgment. Do not burn the case up. Just warm them up slowly and push the teeth off. Then trim the plaster down as it should be just to and not below the edge of the plate. With some sand paper on the lathe take off the rubber on the lingual surface and between the teeth and any on the palate that is not needed for thickness, leaving a very distinct seat for the teeth. Wax the teeth back in place, being sure that they are well down in their seats, and wax the case and pour the other half of the flask. Separate, throw the old rubber away, and you have your case ready for the new rubber.

B. T. ASBURY.

Editor, Practical Hints:

Recently I placed an arsenic devitalizing paste in an upper right second bicuspid and upper left first molar. I did this by mistake, thinking I had desensitizing paste, which I intended to use.

The devitalizing paste was left in the teeth 15½ hours before I

noticed my mistake. I removed it after that period of time had elapsed and thoroughly cleaned the cavities, after which I sealed in oil of cloves as a sedative. The cavities in the two teeth were not exceptionally deep nor large. I did not remove all the decay, as they were quite hypersensitive. The patient now complains of the teeth being very sore to pressure and aching somewhat. The sedative has been in for two days, and she has had very little relief from the soreness.

The particular paste that I used is supposed to devitalize in from three to five days.

Do you think the devitalizing paste in 15½ hours could have gained enough action on the pulps so that it will be necessary to devitalize these teeth?

Do you think that by leaving a sedative in for a period of time the pulp will return to normal?

J. H. G.

ANSWER—From the symptoms you describe, I would say that the pulps were either dead or seriously affected, and I am afraid that the only thing to do is to open the teeth and clean out the canals. I do not think a sedative will have any effect.

When you removed the arsenic, it seems to me it would have been advisable to clean the cavity out thoroughly and freshen the walls with a bur. Sometimes a small quantity of arsenic is overlooked and left in the cavity to continue the process of devitalization. Perhaps that is what happened in this case.

At any rate, I would open up the teeth very carefully and ascertain the true condition.

Editor, Practical Hints:

A patient, a lady about twenty-nine years of age, has a very slight case of pyorrhea. One molar has a large amalgam restoration, and there are no cavities in the other teeth. About thirty days ago another dentist extracted a lower molar, using infiltration. Then about ten days ago he extracted a lower anterior tooth, again using infiltration. Since that time the patient has had a bitter taste in her mouth, somewhat of a metallic taste. Now it is not so noticeable as soon after the extraction, but it still is disagreeable.

Can you suggest a cause and treatment?

C. S. F.

ANSWER—I think the taste in your patient's mouth is entirely due

to the wounds from extraction, and that when her mouth heals it will disappear. This condition is often very noticeable after tonsillectomy.

Editor, Practical Hints:

I wish to be enlightened on the Crozat Method of Orthodontia. Kindly advise me as to publications, texts or papers on this subject.

N. W. J.

ANSWER—I regret to say that I have never heard of the Crozat Method of Orthodontia. This specialty is now based on a thorough understanding of biology, and the leading men do not hold to any one method. They diagnose the case, outline the best method for securing the results, and use whatever appliance is best suited for the case. No one appliance is the most efficient for every case.

Editor, Practical Hints:

I have a patient who persists in gagging. I have trimmed the plate until it is merely horseshoe in shape, but he still gags. His former plate did not cause gagging, even though it would not stay up without powder.

I had very little trouble in getting the impression and thought I had a good one. Can you offer any suggestions?

J. R. J.

ANSWER—You made your first mistake when you started to trim the plate. When a patient gags, it is generally advisable to make sure that the plate extends back onto the soft palate and is postdammed so that it maintains firm contact at all times.

If you do this, I feel sure that the trouble will be obviated.

Editor, Practical Hints:

An old lady, past sixty, came to me for full upper and lower dentures. She had splendid ridges. I had no trouble in constructing them and making them fit perfectly.

She came back in a few days and told me that there was a constant pressure on the palate. I tried to relieve the pressure, but with no success.

I made her a second plate with a vacuum extending over the whole hard palate, thinking that that would remedy the trouble. It did for just about three days, and she came back and told me the same condition still existed.

There was enough room in the palate to put a gauze packing, and I did that, telling her to change it every day, and even the gauze in the palate did not relieve the condition.

I should like to know the cause of it, and if there is another way to relieve the condition.

A. A. L.

ANSWER—We turned your letter over to our Research Department, and they advised the following:

Remake the plate, securing as perfect an adaptation as possible, and then be sure to relieve the anterior and posterior palatine foramina. Check up the occlusion and make certain that the posteriors are not hitting too hard. This will probably solve your difficulty.

Editor, Practical Hints:

I have been having trouble with my thumb and finger on my right hand caused by procain poisoning. It is healed some except at the joint on the inside of the finger, where it continually cracks open.

I am now using rubber gloves. Can you give me a treatment for this?

E. P. G.

ANSWER—There are a great many cures for novocain dermatitis. The following appears in the *Journal of the American Medical Association* and has produced good results:

Zinc oxid	8 grams
Calamine	4 "
Carbolic acid	2 "
Glycerin	4 c.c.
Water to make	250 c.c.

To be applied as a lotion several times daily and at night before retiring.

Editor, Practical Hints:

Are somnoform and ethyl chlorid really two safe general anesthetics if carefully given? Of the two which is considered the safer? Is more somnoform given now than formerly?

Can a licensed dentist give the above and be absolutely within the

law? If not, what is the best way for a busy dentist to obtain the privilege?

A. B. H.

ANSWER.—Dr. Prinz in his materia medica says: "Somnoform is by no means the safest of all anesthetics; a few deaths have been recorded following its use, and as soon as its name disappears from public print it will be forgotten, as it offers no advantage over pure ethyl chlorid." Nitrous oxid and oxygen is considered safer, but care and experience are necessary in administering any anesthetic.

In most states a dentist has a legal right to administer an anesthetic.

Editor, Practical Hints:

Enclosed please find x-ray film of a patient 36 years of age who complains of neuralgic pains and sensitiveness to heat and cold in the lower anterior teeth. Full mouth x-ray shows no other pathology. The six anterior teeth have pulp stones, I believe. How can I help him?

H. M. L.

ANSWER.—The first thing is to make sure that the lower anteriors were not being subjected to traumatic occlusion. This is very frequently the cause of pain and sensitiveness. If this fails, I would remove the pulp stones and treat and fill the root canals. Pulp stones are not always the cause of trouble, and as they are sometimes difficult to remove I would first try correcting the occlusion.

DENTAL SECRETARIES and ASSISTANTS

Secretaries' Questionnaire

All questions and communications should be addressed to Elsie Pierce, care of THE DENTAL DIGEST, 220 West 42nd Street, New York City.

NOTE—HAVE YOU A BETTER WAY? HAVE YOU A TIME-SAVING SHORT CUT? DO YOU KNOW A "STUNT" THAT LIGHTENS THE WORK OR MAKES FOR EFFICIENCY IN THE OFFICE? IF SO, WRITE TO ELSIE PIERCE, CARE THE DENTAL DIGEST, 220 WEST 42ND ST., NEW YORK. YOU MAY HELP A NUMBER OF GIRLS WHO ARE JUST BEGINNERS—AND YOU KNOW HOW YOU NEEDED HELP DURING YOUR FIRST FEW MONTHS IN A DENTAL OFFICE. OR IF YOU NEED HELP NOW WRITE TO ELSIE PIERCE—SHE'LL HELP YOU.

Dear Miss Pierce:

Please tell me how to sterilize rubber gloves, rubber dam, gutta-percha points, etc. I have been an assistant only a few months and am anxious to learn all I can. Your Department is a wonderful help to me. I can hardly wait for the magazine to come into the office each month, and the doctor always has me read the Questionnaire to him. He says he has learned many useful things from it. A. C., Iowa.

ANSWER.—The very best way to sterilize rubber goods of any kind is to wrap them in dental napkins or towels or wraps made for the purpose and sterilize in an autoclave type of sterilizer. However, many dental offices do not have that type of sterilizer, so I suggest the following:

For rubber gloves, scrub in warm water and germicidal soap, dry carefully with sterile towel, in each finger placing a sterile cotton roll to keep them from sticking. The cotton rolls can be tied together to form the outline of a hand, the one for the thumb being cut shorter. Place in a towel or wrap and keep in the chemical sterilizing chamber of the sterilizer or other cabinet. Always turn back the cuff of the gloves so that the doctor can put them on without touching the outside. When the gloves are on the doctor's hands, for further precaution you can take a piece of sterile gauze and wipe them off with pure alcohol.

To make the glove wraps, take a piece of muslin or linen wide enough to hold one or two pairs of gloves and long enough to allow for a piece to be folded up and stitched into sections the length of the gloves and a flap to fold down over the stitched sections. Sew on a tie tape so as to hold the rolled wrap in place.

For rubber dam, cut into the desired length, scrub with warm water and germicidal soap, dry with sterile towel and place in sterile gauze packet. Wipe off with pure alcohol prior to the doctor's placing it in the patient's mouth. The individual packets of rubber dam may be kept in the chemical chamber with the rubber gloves.

For gutta-percha points, take the required number needed by the doctor for a given operation and place in a small glass or porcelain dish and cover with pure alcohol or campho-phenol.

If you have an autoclave type of sterilizer in your office, scrub the rubber gloves, dry, fill the fingers with the cotton rolls and put in towels or wraps in the sterilizer. For the rubber dam, cut into desired lengths, put into gauze packets and place in the sterilizer. For gutta-percha points, keep in small gauze packets and place in the sterilizer.

In some offices the rubber gloves and materials are boiled. If you use this method, put boric acid crystals into the water. They will help to keep the rubber elastic and reduce its deterioration, but rubber goods of any kind will not stand boiling without damage.

Dear Miss Pierce:

I have received so many valuable suggestions from the Questionnaire that I wish to send something in exchange which may help some of your readers.

In my office I prepare the novocain solutions for the doctor and fill the hypodermic syringes. Some time ago I noticed a peculiar rash on parts of my hands and fingers. It would get almost well and then come back worse than ever. I went to my physician, and he thought at first that it was the result of improper diet or some systemic disturbance or was caused from some contact infection from towels. One day, while talking it over with my employer, he thought of the novocain, having had a dentist friend whose hands had become so badly infected that he had had to stop practicing dentistry for several months. I told my physician of my preparing the novocain solutions and asked him if he thought this was what caused my trouble. He agreed that it might be and forbade my preparing the solutions without first putting on rubber gloves and using every care so that none of the novocain should come in contact with my skin. He prescribed the cleaning of my hands with olive oil and the application of lanolin salve. In a few weeks my hands

were as good as new, and by carefully following instructions I have had no recurrence of the trouble.

J. D., Conn.

We thank J. D. for her good advice and for calling this experience to our attention. It will no doubt remind our readers to use caution when preparing novocain solutions and filling hypodermic syringes. It also offers a simple remedy should any of our readers be afflicted with a similar dermatitis.

May we add to the advice given by cautioning the assistants who mix amalgam not to do so with the thumb in the palm of the hand. We have seen several cases of badly infected thumbs and palms as a result of mercurial poisoning. The skin cracks and open wounds are the result, which are stubborn to heal. If the dentist insists that his amalgam filling material must be mixed in this fashion, use rubber gloves or a rubber finger for the thumb and a piece of chamois in the palm of the hand. However, manufacturers of alloys, in their instructions for mixing, always condemn this method of mixing, and various types of mixing devices are on the market which, if used properly, are very satisfactory.

In addition, we caution our readers about the developing and fixing solutions for x-rays. With some people they also cause an infection of the skin, which is very painful and annoying.

Dear Miss Pierce:

I am a dental hygienist and should appreciate it very much if you could give me a few suggestions of what I should send to children to inform them that prophylactic treatments are due. I enjoy reading THE DENTAL DIGEST very much.

M., Syracuse, N. Y.

ANSWER.—In the case of young children your effort should be directed to the mother as far as professional notices of prophylactic treatments are concerned. When the child comes to the office, then you can enlist his interest and incite his curiosity by stories, picture cards, booklets, etc., about teeth and their care, in such language as a child will understand; then you can have on hand inexpensive toys or favors which can be given to him to take home, and he will remember his pleasant visit and be anxious to come again.

For older children you can awaken in their minds the charm of good looks and strength, as the result of well-cared-for mouths and teeth, and provide in the waiting room such books, games, puzzles, etc., as

will make them glad to come and sit a while in the office, and they will look forward to their visits.

To send to children notices that would attract their attention would savor strongly of cheap advertising methods and detract from professional dignity. The only thing that I can suggest is that, attached to the formal printed notice to the parent, there could be a small card duplicating the larger one on which you could write the child's name and which he could feel was his very own, but this would impress only children of a certain age.

Again I repeat that the parents are the ones who control the attendance of children at the dentist's, and they should be the ones to be notified and primarily impressed with the need for dental care.

Educational and Efficiency Society for Dental Assistants, First District, New York, Inc.

The Educational and Efficiency Society Clinic Club resumed its activities at a meeting held on Monday evening, September 17, 1928, at the office of Dr. R. S. Eolis, Times Bldg., New York.

Plans were completed for presenting table clinics consisting of chair-assisting, x-ray, and sterilization demonstrations before the Eastern District Dental Society on Thursday evening, November 1, 1928. Plans are also under way for the presentation of demonstrations and table clinics before the students of the Allied Council Dental Society during the coming season.

As part of a group of clinics presented by dental assistants before the American Dental Assistants Association Convention at Minneapolis, Minn., August 20-25, 1928, demonstrations in oral surgery assistance and first aid were given by members of the Educational and Efficiency Society.

At the same meeting, as a contribution to the general display for the Health Exhibit, members of the Educational and Efficiency Society depicted by means of posters and models the manner in which the dental assistant can be of service to the patient, both child and adult, as to the proper method of toothbrushing as taught by the dentist in daily practice and in his instructions for prevention and health. The care of the toothbrush was shown in the same way.

Classes will be resumed with the opening of the autumn activities. The classes are given under the supervision of capable members of the dental profession.

The Library contains many articles of special interest to the dental assistant. Any article may be borrowed by the members for home study.

The October meeting of the Educational and Efficiency Society for Dental Assistants, First District, New York, will be held at the Academy of Medicine, 103rd Street and Fifth Avenue, New York, on Tuesday evening, October 9, 1928, at 8 P. M. A prominent member of the dental profession will be the essayist of the evening.

The Society meets on the second Tuesday of each month, October to May, inclusive, at the Academy of Medicine. A cordial invitation is extended to the members of the profession and to their assistants.

Dental assistants who are actively employed in the conduct of ethical dental offices are urged to join. The Society offers many opportunities to young women who are striving to further the ideals of the profession in which they are employed. Ethel Meyerson, Chairman of the Membership Committee, 1220 Bryant Avenue, New York, will be glad to give any desired information.

American Dental Assistants Association Fourth Annual Meeting

The Fourth Annual Meeting of the American Dental Assistants Association was held at Minneapolis, Minn., on August 20-24, 1928.

This year the Association was given the privilege of a booth as a part of the Health Exhibits of the American Dental Association at the Minneapolis Auditorium, and a very interesting exhibit was on display beginning with Monday morning, August 20, at 8:30 until the close of the meeting. The exhibit depicted what the dental assistant does in her service for the dentist and patient that is directly related to health service and prevention. On Monday, August 20th, were also held the preliminary meetings of the Board of Trustees of the Association.

The first session of the House of Delegates was held on Tuesday, August 21, at 9 A. M. Following the business routine, a very interesting address was given by Dr. John E. Gurley of San Francisco, Calif., on "Chemistry for the Dental Assistant." At 2 P. M. the General Meeting was held. The speakers were Dr. Harry W. Nelson of Minneapolis, Dr. C. N. Johnson, Editor of the Journal of the American Dental Association, Dr. Thomas B. Hartzell, Dr. F. E. Cobb, Dr. George West, Dr. F. E. McLain, Miss Stella Peterson, Miss Mae Campbell, Mrs. Helen Fitting, and Miss Willie Carroll. At this meeting the President's address was given. A gavel of ebony, gold mounted was presented to the President, Juliette A. Southard by the Minneapolis District Society of Dental Assistants, one of the constituents of the State organization.

At the Minneapolis Auditorium on Wednesday, August 22, were

held the clinics demonstrating the many phases of assisting in the conduct of a dental practice. These clinics were given by the affiliated societies and received much commendation from the members of the dental profession who attended them. On Wednesday evening the annual banquet was held at the Leamington Hotel. The ballroom was filled to capacity by the members and their friends. A number of prominent members of the dental profession were present, among the guests of honor being Dr. R. H. Volland, the President, and the officers of the American Dental Association; Dr. C. E. Rudolph, President of the Minnesota State Dental Society; Dr. C. A. Swanson, President of the Minneapolis Dental Society; Dr. H. A. Holmberg, President of the St. Paul Dental Society; Dr. H. W. Nelson, Chairman of the Local Arrangements Committee for the American Dental Association; Dr. W. F. Lasby, Dean of the College of Dentistry, University of Minnesota; Dr. C. N. Johnson, Dr. Henry Fowler, Dr. F. Denton White, Dr. C. O. Flagstad, Dr. George Wood Clapp. The speakers of the evening were Dr. R. S. Vinsant, Dean of the College of Dentistry, University of Tennessee, and Aloise Clement, of Omaha, Neb.

On Thursday, August 23rd, the House of Delegates held a session and the following were elected to office for the ensuing year: President, Juliette A. Southard, New York City; First Vice President, Grace B. Renshaw, Cincinnati, Ohio; Second Vice President, Mae Campbell, Minneapolis, Minn.; Third Vice President, Marie Sillay, Atlanta, Ga.; General Secretary, Ruth F. Rogers, Chicago, Ill.; Treasurer, Angie Ryan, Chicago, Ill.; Board of Trustees, three-year term, First District, Agnes F. Phillips; Second District, Mary H. Brady; Sixth District, Mary M. Hill; Seventh District, Mary Lage, to fill out an unexpired term.

Several organizations were admitted to membership at this annual meeting, also a number of independent members from localities where there are as yet no societies organized. The membership now nears the 900 mark, an encouraging growth from less than 200 when the organization was formed a short four years ago. A number of new organizations were heard from in various parts of the country and we hope to announce their affiliation with the national group before long.

The particular purpose and object of the American Dental Assistants Association is to aid in the advancement and elevation of the service to the dental profession by encouraging dental assistants to raise their standards of education through lectures, clinical demonstrations, discussions, and instruction in the details of their duties; and to bring to the members a realization of the responsibilities that accrue to them in their relation to the public; to inspire its members with a desire to render more efficient service and to be truthful, honest and loyal to the profession which they serve; to create a feeling of fellowship and

cooperation among its members, and promote among them a desire for mutual improvement. Women employed in ethical dental offices are eligible for membership.

For information regarding the American Dental Assistants Association address General Secretary, Ruth F. Rogers, Suite 803, 223 West Jackson Boulevard, Chicago, Ill.

Dental Assisting Along the Allegheny

By Blodwen M. Williams, Oil City, Pa.

(EDITOR'S NOTE: One of the most intelligent critics of dental offices brought to the editor's sanctum the story of a model office in a community so small that one would scarcely think it possible. This critic, after describing the dentist and the service, ascribed no small part of the success of that office to the dental assistant who was secretary, manager and dental nurse.

At our request Miss Williams has written out a part of her story, but only a part, for she was compelled to leave out the story of how she does it. Here, however, is an article by one who is said to be master of her subject.—G. W. C.)

May I ask those of you who live in the cities, where every convenience is at hand, how much thought you have given to the vast suburban or rural population that desires the best in dental service, and that, because of environment and inability to spare the time or possibly the finance, is forced to accept what is available—good, bad or indifferent, as the case may be. Perhaps a pen picture of a dental office "out in the sticks" may not be amiss and may prove of interest. In connection with this dental office may I tell you about dental assisting, the most interesting and worth-while occupation for service to humanity that I have found in years.

Somewhere along the beautiful Allegheny River lies a quiet country village of a few hundred inhabitants. In this delightful setting is located a very modern and complete rural dental office. At its head is an ambitious, ethically professional, general practitioner, who though young is maintaining high ideals and affording his rural patients the best this twentieth century can bestow in this line of health service. I have the privilege of being associated in this dental office as the assistant or nurse.

Our office is modern in every way and so situated that the sun shines in most all the day, large windows in every room give free access to an abundance of fresh, pure air, and all day long a glance from the windows of the main operating room reveals a beautiful panorama—the

flowing river, the hills beyond, green growing things, trees, blue sky, fleecy clouds, a picture of which one never tires. The reception room is tastefully decorated and furnished with comfortable easy chairs, pretty reading lamp and copies of the latest editions of several good magazines on the table and several juvenile picture-books. A convenient dressing room is next to the reception room. The main operating room is equipped with a complete dental unit, with modern accessories, dental cabinet, sterilizer, etc. Here, too, we have our desk and filing cabinet, for the doctor believes in keeping accurate charts and books. Our second operating room is equipped with an x-ray machine and nitrous-oxid-and-oxygen equipment. Here we care for our surgical and extraction cases. A very complete laboratory enables us to care for this phase of the work, and there are many other necessary things too numerous to mention that add to the efficiency of the office and the comfort of the patients.

Does this give you a mind's-eye view of where I labor? Then let me tell you of some of my duties, which are many and varied. One never knows just what to expect, hence one must be ready for any emergency. A routine or procedure book would be of little value, but the trained dental assistant has the ability to meet situations with common sense and dignity.

Our city is known as the smallest in the United States, but our patients come to us from far and wide. Some days an entire family comes to the office, driving seventeen miles or more over partly improved roads to have as much dental work done as possible. There are mother, father and five children; the entire afternoon is reserved for them. Mother is first in the dental chair, father holds the baby, and the assistant becomes nurse-maid for the time being to the other four children, who are to be amused. Have you tried to entertain strange children, especially in a dental office? It is no easy task to fill with credit. In the meantime, mother must have a tooth extracted. She is nervous, must have gas, and the dental nurse is needed to administer the anesthetic; so presto—she becomes at once the capable assistant to the doctor. Following this particular operation each member of the family in turn is placed in the dental chair, and while the doctor performs the various dental operations needed, the assistant divides her time between the professional duties required of her and amusing the children, always maintaining her poise, tact and discretion, as well as her smiles.

At last the end of the afternoon is reached and the work completed for that visit. The happy family start on their homeward journey with smiling faces and, let us hope, far pleasanter thoughts of the afternoon than they experienced on their way to the office. What a contrast from the conditions existing only a few years ago in the average dental office!

The assistant has been hostess, chair assistant, nurse, and from the viewpoint of the patients has contributed no small share to the success of their visit.

How many of you have had the opportunity of witnessing the first visit of a farmer boy to a dental office? It is indeed an insight into real human nature. Innocent, not knowing quite what to expect, in fear and trembling, he enters. You must use every endeavor not to embarrass him. No doubt his mind is filled with memories of stories told him about the "doings" in dental offices. He needs dental attention, and our country needs strong, healthy men. Without clean, well preserved teeth this is not possible, therefore he must have no fear of the dentist or his work. Everything must be done kindly for him, and the assistant plays a vital part in placing him at his ease and inspiring confidence, so that he will return willingly and cheerfully.

There are days when those suffering severe pain come to the office. In such cases the assistant has an opportunity to extend to the sufferer a gentle, smiling and sympathetic greeting, which does much to relieve the nervous tension and inspire confidence for the operation that is to follow. The evident happiness from this sympathetic understanding is a wonderful reward to the dental assistant. Our rural people are so responsive to the human touches of life and are very receptive to the courtesies offered. These touches may seem small, but they are eagerly looked for. You would perhaps be surprised to find how much this vast rural public expects and, on the other hand, how interesting they are, and through acquaintance how sincere the wholesome country folk become.

I feel very young in this great field of endeavor, for it has been my privilege to serve in this work only for the past six years. My time previous to this was centered in nursing, and, while I found this experience valuable, my present vocation of dental nursing is truly a great human incentive.

As I look back, I find many interesting phases in this new profession, for it *is* such, you know. The modern dental office is not considered truly professional without the immaculately white-garbed woman assistant in attendance. As I think over the situation, I see remarkable achievement scheduled for the dentist of the future who is aided in his service by a competent dental nurse or assistant, and, last but not least, a happier and more satisfied general public. Scientific dentistry, restorative dentistry, assisted by the university-trained dental assistant, will be a real vocation.

I must tell you about the interesting x-ray service in this country district, where hospital aid is between 30 and 40 miles distant. Perhaps in this work I have been more fortunate than most dental assistants, as

our x-ray machine has been invaluable, being the only one available within a radius of 150 miles. Five medical doctors use it for all kinds of diagnosis, especially fractures and accident cases. These could not be cared for in a dental office without an assistant, as the dentist could not spare the time from the chair to assist physicians in this service. In the country children fall off porches and out of apple trees and break their arms or legs; aged people slip on icy steps and boardwalks and fracture their limbs; automobiles collide on country roads, causing injuries to the passengers, etc., etc. Thus all about us the doctors bring their patients to our dental office for x-ray pictures, and the patients receive the best medical aid possible with less suffering and at a minimum expense. Meanwhile the assistant helps the doctors and develops the pictures. It has been my privilege also to assist in reducing fractures painlessly through the administration of nitrous oxid and oxygen. What greater blessing could come to the suffering rural public, and what greater satisfaction to those who must serve them than the satisfaction of knowing that the very best has been done!

As I have said, many interesting things have happened in the past six years, some filled with pathos and some with humor. I think I shall never forget one day in particular, when, upon entering the reception room to inquire the needs of a newly entered patient (for a rural practice cannot be entirely an appointment practice), he replied that his bridge had fallen down and could the doctor fix it. Asking him to be seated, I told him I was quite sure the doctor could fix the bridge, and that he would see him in a little while, of course not disclosing my amusement, for I readily understood it was the bridge in his mouth and not the one over the "crick" back of his barn.

In conclusion, let me tell you what we are doing for the school children in our rural district. Early in the spring of 1926 Dental Week was preying on my mind, for in our community, "dentally speaking," nothing had ever been suggested to interest our coming citizens in health through the teeth. There are no civic nor service clubs, so the doctor and I agreed to examine and clean every child's teeth in our graded school, hoping to sow the seed for future action in home care and parental "dental" interest. Doctor visited the classrooms and became known to the children as a friend and not as an "ogre," and we then adopted the following plan:

Three mornings each week a group of ten children came to the office, where after welcoming them I took them into our second operating room. Exchanging pleasantries of the day, I placed the children in line, boys to the rear, girls in front, for ladies always precede gentlemen. On the cabinet were placed a toothbrush, mouth mirror, pliers and explorer. On hand were small story-books and samples of tooth-paste donated by the manufacturers. Each child was charted and given his

chart to hand to the doctor, thus inspiring them with independence plus confidence. We then had a lesson in brushing teeth with a questionnaire of, "How many brush their teeth and how often?" It was indeed interesting to note the following-up of this question after the first few groups had visited us.

We then explained and examined the instruments, each child taking them in his own hands to help allay any hidden fear, for conversations about the horrors of a dental office seem still in evidence even in this enlightened twentieth century. The story-books were next distributed, and a story was read to them explaining the vital importance of the worthy six-year molar. This grinder of prominence is so vastly important to the growing child that its care cannot be too forcefully stressed. We cited the puppy and his pearly teeth, cleansed through his diet and hardened through exercise, regular habits of food. Can we children find such assistance in the care of our teeth? Yes, indeed! Eat breakfast cereals dry, shredded wheat and dry toast, crusts of jelly bread, instead of hiding them under the plate rims. Oh, yes, we were all children once, but we did not have what this present-day child has—the forethought of the interested adult!

Once you enter into this important service to the children, you will never forget it. In all we cared for 227 little ones gratuitously, following up the cleaning and examination with a note to the parents or guardians explaining the need of dental attention to the permanent teeth already in position. I can safely say that 50% answered the call to attention. Was it worth while? Will it bear repetition? I say it will!

EXTRACTIONS

No Literature can have a long continuance if not diversified with humor—*ADDISON*

If the "missing link" is discovered, the human race might do well to put it in the place of some of the links that are not missing.

(Mother)—You awful child, what do you mean by coming home with your new dress full of holes?

(Child)—Aw, mom, we wuz playing grocery, and I wuz a swiss cheese.

Things take care of themselves. Trains have more safety devices in these days in which there isn't a petticoat left in all the land with which to flag 'em.

MISTAKEN SIGNAL

(Druggist)—Say, doc, can you fix this twitching eye of mine?

(Doctor)—Is it troubling you much?

(Druggist)—Well, yes, in a way. You see every time I wait on a man and he sees that twitch he says "don't care if I do."

THEN AND NOW

"You must wake and call me early, call
me early, Mother dear."
That was often said to mothers by the
girls of yesteryear;
But the girls now tell their maters as
they start out for a spin:
"You must wake up early, Mother;
someone's gotta let me in."

(Tom)—Hello, Jake; I met your old rival today. He looked fine and jolly, and seemed to have a great load off his shoulders.

(Jake)—Yeh! He must have washed his neck.

A scientist says the teeth of a gorilla are so deep set they can't be pulled, but we have an idea he doesn't know our dentist.

(Old Lady—visiting New York Museum)—Have you a mummy of King Tut here?

(Attendant)—No, madam.

(Old Lady—surprised)—Dear me, they have a very fine one in the British Museum.

The man who takes a nap while holding a steering wheel usually wakes up holding a harp instead.

There's a Scotchman in our neighborhood who gives his kids music lessons so he won't have to get their hair cut.

(Teacher)—When Sir Walter Raleigh put his cloak down on the muddy pavement for Queen Elizabeth to cross over what did he say?

(Red-head Bill)—Step on it, Lizzie, step on it!

ONLY A FEW YEARS AGO

At Fort Meyer today Orville Wright made the two greatest airplane flights ever made publicly in this country. He remained in the air over eleven minutes on his first flight and nearly eight minutes on his second.

(Waitress)—You wished your coffee without cream, sir. I'm sorry we have no cream. Will you have it without milk?

Most men call a spade a spade until they happen to let it drop on their toe.

(First Electrician)—You put me in mind of George Washington.

(Second Electrician)—That's funny, he wasn't an electrical expert.

(First Electrician)—That's it; neither are you.

A surveyor is wondering what becomes of the portion of road which is worn away by motor cars. Apparently he's never seen the average pedestrian brushing his clothes.

Dingbat's wife calls him "maple syrup." She explains why by saying, he is such a refined sap.

Probably no man ever got so much conversation out of a surgical operation as Adam did.

Don't waste your life. Work like Helen B. Happy.

As soon as day begins to dawn
The meadow-lark starts singing.
As soon as evening comes, a star—
The angel's lamp—starts swinging.
As soon as I am in the tub
The telephone starts ringing!

FUTURE EVENTS

THE MASSACHUSETTS BOARD OF DENTAL EXAMINERS will hold an examination for registration for both dentists and oral hygienists in the City of Boston, Massachusetts, on October 9-11, 1928. Full information, application blanks, etc., may be secured at the office of the Secretary, Room 146, State House, Boston. All applications must be filed at the office of the Secretary at least ten days before date set for examination.

W. HENRY GRANT, *Secretary.*

OCTOBER, 1928 MEETINGS OF FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK

October 10. Charles H. Mayo, M.D., will read a paper on *The Interdependence of Medicine and Dentistry.*

October 17. Prof. Dr. Alfred Gysi will give an illustrated lecture on *Practical Conclusions from Scientific Research in Denture Construction.*

These lectures will take place in the Academy of Medicine, 103rd Street and Fifth Avenue, New York, N. Y., at 8 P. M.

CHANGE OF DATE

TENTH DISTRICT DENTAL SOCIETY OF THE TENNESSEE STATE DENTAL ASSOCIATION. THE TRI-STATE CLINIC meets in Memphis, October 22-23, 1928, instead of October 15-16 as already announced.

An intensive program of Preventive Dentistry has been arranged for two days and one evening.

Such men as Drs. Thaddeus Hyatt, Russell W. Bunting, Sherman L. Davis, Arthur H. Merritt and Boyd S. Gardner will lecture and clinic.

Attendance is limited to two hundred and fifty, and a fee will be charged to defray actual expenses. Reservations will be made in order of their receipt.

For further information, address

TERRELL R. OGDEN, *Secretary,*
628 Medical Arts Bldg., Memphis, Tenn.

THE INDIANA BOARD OF DENTAL EXAMINERS will meet at 8:00 A. M., November 12, 1928, at the State House, Indianapolis, Indiana, in the House of Representatives Room, for the purpose of examining all applicants with proper credentials. All applications should be in the hands of the Secretary one week before the Board meeting.

For applications, clinical requirements and other information, address

J. M. HALE, *Secretary-Treasurer,*
Mt. Vernon, Indiana.

THE CONNECTICUT DENTAL COMMISSION will meet at Hartford, Connecticut, on November 20-22, 1928, to examine applicants for license to practice dentistry and dental hygiene, and to transact any other business proper to come before them.

For further information address

ARTHUR B. HOLMES, *Recorder,*
80 Central Avenue, Waterbury, Conn.

THE FIRST DISTRICT DENTAL SOCIETY, STATE OF NEW YORK, will hold its fourth December Meeting for Better Dentistry at Hotel Pennsylvania, New York, on December 3-6, 1928.

This year the Main Ball Room and the Southeast Ball Room will be used, in addition to the Roof Garden.

This will be a subscription meeting, as were the former ones, one subscription admitting to all lectures and clinics.

As in former years, subscribers must register for many of the clinics, although there will be a large number of so-called open clinics.

Special features will be an Oral Hygiene Luncheon on Wednesday, December 5, when Percy R. Howe, President of the American Dental Association, will be the guest of honor. Other National officers to be present are Harry Pinney, Secretary, and C. N. Johnson, Editor.

On Wednesday afternoon, December 5, there will be a session of four Section meetings, under the direction of the Section Chairmen, devoted to subjects on Oral Surgery, Preventive Dentistry, Pathodontia and Prosthodontia. On Thursday, December 6, at 2 P. M., the Topic Discussions, which have proved to be one of the most popular features, will be held. On Thursday evening, December 6, the Grand Ball Room and adjacent rooms and foyer will be the scene of the General Clinics.

Manufacturers' exhibits will be shown during the meeting.

Address all inquiries to E. M. Davies, Executive Secretary, Academy of Medicine, Fifth Avenue and 103rd Street, New York, N. Y.

JOHN T. HANKS, *Secretary.*

THE COLORADO STATE BOARD OF DENTAL EXAMINERS will hold its semi-annual examination in Denver for five days commencing December 4, 1928. For information, address

WM. H. FLINT, D.D.S., *Secretary,*
Littleton, Colorado.

THE MINNESOTA STATE BOARD OF DENTAL EXAMINERS will hold its next meeting on January 11, 1929, at the College of Dentistry, University of Minnesota, Minneapolis, Minn. Applications must be in the office of the Secretary by January 1st, 1929.

DR. F. E. COBB, *Secretary,*
601 Donaldson Bldg., Minneapolis, Minn.

THE CHICAGO DENTAL SOCIETY will hold its sixty-fifth annual meeting and clinic January 14-16, 1929.

The Chicago Dental Society wishes to announce its 1929 Annual Meeting and

Clinic at the STEVENS HOTEL. Please take notice of change from the Drake Hotel to the Stevens Hotel with its three thousand rooms and with ideal conditions for staging the yearly classic.

All members of the American Dental Association are cordially invited to attend. Preliminary programs will be mailed to all members of the A. D. A. sometime in December of this year. The program will be divided into eight sections, as follows:

Section I—Operative Dentistry.
Chairman: O. J. Olafsson, 55 East Washington Street.
Secretary: E. J. Krejci, 7060 Clyde Avenue.

Section II—Full Dentures.
Chairman: R. O. Schlosser, Northwestern University.
Secretary: E. C. Pendleton, Chicago College.

Section III—Partial Dentures; Crown and Bridge.
Chairman: Stanley D. Tylman, 185 North Wabash Avenue.
Secretary: W. H. Kubacki, 2949 Milwaukee Avenue.

Section IV—Mouth Hygiene, Children's Dentistry.
Chairman: E. E. Graham, 58 East Washington Street.
Secretary: E. W. Swanson, 25 East Washington Street.

Section V—Orthodontia.
Chairman: B. O. Sippy, 30 North Michigan Avenue.
Secretary: C. R. Baker, 708 Church Street, Evanston.

Section VI—Oral Pathology.
Chairman: E. H. Hatton, Northwestern University.
Secretary: J. R. Blayney, University of Illinois.

Section VII—Oral Surgery.
Chairman: J. E. Schaefer, 55 East Washington Street.
Secretary: Eli Olech, 4259 West Madison Street.

Section VIII—Radiology.
Chairman: E. H. Thomas, 30 North Michigan Boulevard.
Secretary: M. A. Root, 636 Church Street, Evanston.

The Program Committee is under the direction of Frederick B. Noyes, assisted by Stanley D. Tylman, Vice-Chairman; I. G. Jirka, Charles R. Baker and Howard Alexander.

Louis E. Jelinek, *President,*
Hugo G. Fisher, *Secretary,*
185 North Wabash Avenue, Chicago, Ill.